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ELECTRICAL CONTRACTING

ENGINEERING • INSTALLATION • REPAIRING • MARKETING

AUGUST · 1935

Plan to Attend

N.E.C.A.
CONVENTION
Hotel LaSalle
Chicago, Ill.
September 23, 24, 25

◆

Next Month

CONVENTION ISSUE

With Special Study on

Successful Selling Methods and Marketing Opportunities for Contractors

A Field Study of Reinspection at Work . . . . . .

- A 5-man Management Plan
- Planned Installation Methods
- A Repair Shop Hoisting Layout
- New Restaurant Markets
- Rewiring the Home Modern
- Defective Services
- Steel Supports Erection Costs

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AN INSTRUMENT BUILT FOR THE ELECTRICAL CONTRACTOR

EVERY job for which a contractor needs an electric testing instrument was considered in the design of G-E Type AP-9 instruments.

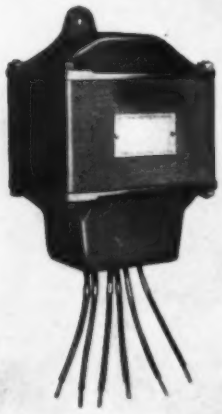
You want portable instruments with a reasonable degree of accuracy and which will stand a lot of rough usage. AP-9 instruments have these features and will give you excellent performance and long-time service.

You should see one to appreciate its good points: Neat and compact; easy to handle and carry; self-ventilated, no holes to let in dust. Cover protects glass and encloses terminals. Clear and distinct scale markings, mirror, and knife-edge pointer, insure quick and accurate readings. Then, when you learn the price, you will agree that it is "a lot of instrument for the money."

A G-E AP-9 150/300-VOLT VOLTMETER

This line includes voltmeters, milliammeters, ammeters, and wattmeters for a-c or d-c. measurements. Size: 2 1/2 by 4 3/4 by 6 1/2 in. Weight: 3 1/2 lb. For details and prices, see Bulletin GEA-1784. Address the nearest G-E distributor, G-E office, or General Electric Company, Dept. 6B-201, Schenectady, New York.

SAVE MONEY FOR YOUR CUSTOMERS WITH THESE G-E TRANSFORMERS



RECOMMEND to your industrial customer that he put all his power load on the power circuit. By doing so, he can save money, where the rate on power circuits is lower.

Such loads as small drills, compressors, fans, soldering irons, etc., do not belong on the lighting circuit but on the power circuit. They can be transferred, easily and inexpensively, by installing small G-E air-cooled transformers.

These G-E air-cooled transformers are available for practically any application where a special voltage of 600 or less is required. They are small, compact, easily installed, require no fireproof vault, and are neat in appearance.

This is profitable business for you; why not cash in on it now?

430-55

SPECIFY G-E INSULATED CABLE

YOUR customers will always be satisfied when you recommend G-E insulated cable. Every type has a good reputation for reliability.

You can get it in every type, size, and voltage for every application. Shipments can be made promptly because many sizes are carried in stock. See the G-E distributor nearest you.

A new publication just issued will be helpful to you in selecting the right type of rubber-insulated cable. It is GEA-2133, "Cable Compounds." For a copy address the nearest G-E sales office, or General Electric Company, Dept. 6—201, Schenectady, N. Y.

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S. B. WILLIAMS
Editor
F. J. SEILER
Assistant Editor

HOWARD EHRLICH
President
GLENN SUTTON
Manager

ELECTRICAL CONTRACTING

Established 1901
Official Publication
of the
National Electrical
Contractors Association

INSTALLATION

ENGINEERING

MAINTENANCE

REPAIRING

MANAGEMENT

MARKETING

for

ELECTRICAL CONTRACTORS

INDUSTRIAL
COMMERCIAL
RESIDENTIAL

ELECTRICAL INSPECTORS

ENGINEERS

SERVICE SHOPS

and others engaged in the business of electrical construction

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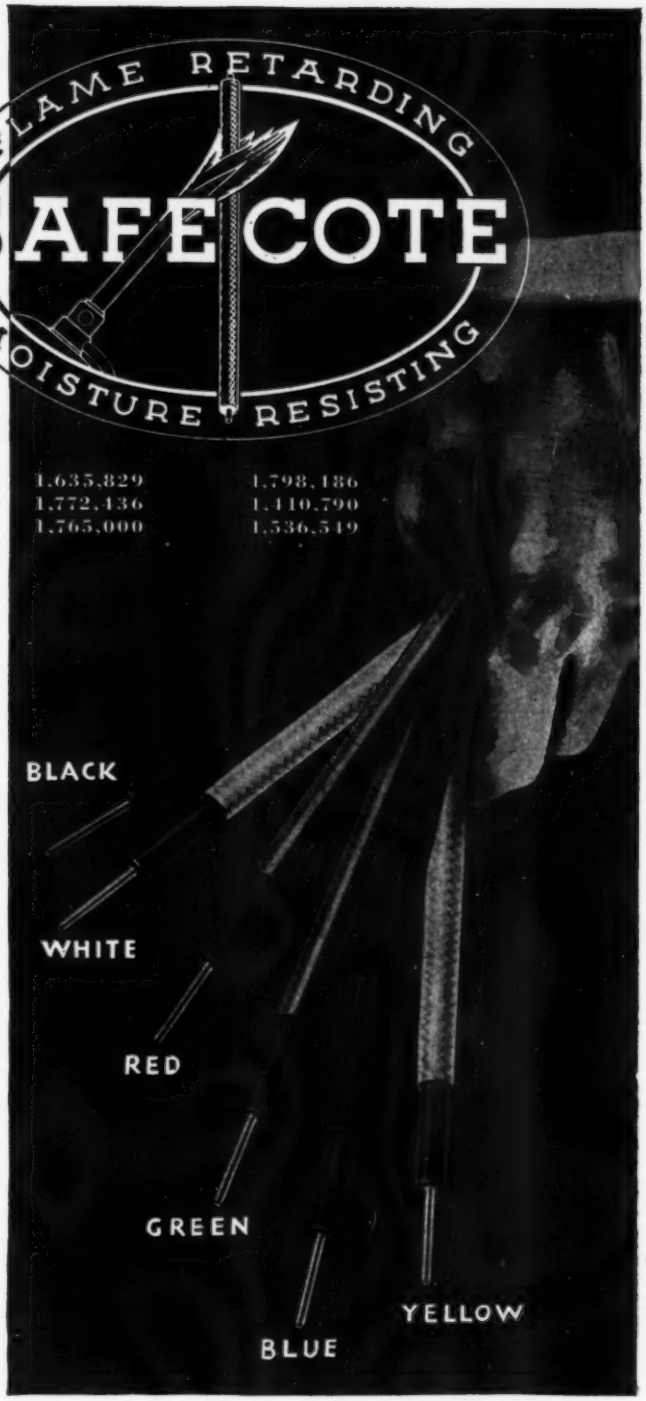
SAFECOTE WIRE *Performance* depends upon its INSULATION



Rubber insulation by the world's largest producer of rubber is your best guarantee for maximum performance.

U. S. Safecote wire is made in all sizes; in colors for circuit identification.

United States Rubber Products, Inc.
1790 Broadway, New York
Stocks in All Industrial Centers

1935 is the 25th anniversary of "U.S." Rubber plantations in the Far East. And the crude rubber production of "U.S." is now more than three times the combined output of all other American rubber companies combined. Controlled quality from the rubber tree, to the finished product, assures extra value and extra performance for the user.

UNITED STATES RUBBER COMPANY US TRADE MARK

United States Rubber Company

AUGUST 1935

Marketing

IN NORMAL times more than a quarter of a billion dollars of products find their ultimate market through the electrical contractor. The problem and the economics of marketing such a large volume of goods through this outlet is one of the major editorial activities of ELECTRICAL CONTRACTING.

THE products involved in this business may be classified in two general groupings: Supplies and equipment. In the first case, the job of installation or repair comes first, and the supplies are purchased to take care of that job. In the second case, the equipment comes first, and the installation is secondary thereto. This rather broad classification is necessary to understand the problems of marketing by electrical contractors.

MARKETING involves more than just making a sale. Assuming that the above classification is correct, the path to better marketing in the first class lies through an understanding of the true value of quality products, as well as a knowledge of the value to the customer of more adequate wiring. In the second case, we begin to get away from general electrical construction, and enter the field of specialization. This brings with it the necessity for creating a knowledge of the scope of product markets, as well as the continued search for new markets which the electrical contractor can enter. With the expanding application of electrical equipment, the marketing opportunity for the electrical contractor who is not satisfied to devote all of his energies to general electrical construction is daily broadening.

IT WILL be the policy of ELECTRICAL CONTRACTING to acquaint the contractor with the economic value of quality in different kinds of products, to promote the sales side of adequate wiring, to help the specializing type of contractor to merchandise his specialty, to point out new markets, to bring new opportunities to the attention of the industry, and at the same time through travel in the field, bring to its readers a knowledge of the simple, practical ways of selling that are meeting with success.

UMI

notes:—

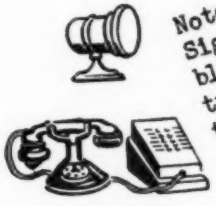
for wide awake contractors

Important selling opportunities are opening up every day -- for alert contractors. By showing that electrical efficiency is the road to profits, alert contractors are turning small orders into big jobs. Here are some pointers:

Note:--Obsolete wiring hinders efficiency, both in industry and commerce. New wiring layout can mean more efficiency -- profits. Sell the idea. Prove the point with dependable supplies from Graybar.

Note:--Better lighting increases production per man in office and factory. A good basis to sell lighting. Turn to Graybar for all kinds of up-to-date fixtures and glassware.

Note:--Check up on motors, too. Graybar can back you up with prompt service on full line of standard motors and control.



Note:--Interphones. Signals. All profitable items for the Contractor. Sell them as time and energy savers.

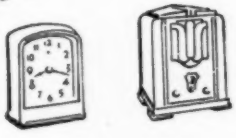
GraybaR

Electric Company

Offices in 77 principal cities.
Executive offices, Graybar Building, New York, N.Y.

P.S.—And more profits this year in Graybar household appliances. Complete line, standard merchandise, delivery service from stock, good profit margin.

P.S.



ELECTRICAL CONTRACTING

Vol. 34 AUGUST, 1935 No. 10

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S. B. Williams, Editor

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FIELD BRIEFS

● EIGHT MILLION LUMENS will be provided for the new San Francisco-Oakland Bay bridge by means of sodium lights. It is estimated by the General Electric engineers in charge of this work that this illumination will be equivalent to the light from thirty-five full moons.

● WHAT IS CLAIMED to be the first 35 k.w. Diesel engine for an automatic emergency lighting system is being used in a new $1,000,000 high school of Reading, Pa., which is being wired by Mitchell & Co., Philadelphia, Pa. George W. Scutt, mechanical engineer of Reading, a strong proponent of Diesel isolated plants, designed the system.

● CONTRACTOR-DEALERS in the Northern Minnesota territory are finding their appliance business more attractive than wiring. For the first six months of this year, the sales for the territory were 2,500 ranges, 1,500 water heaters, 12,000 refrigerators and 20,159 washing machines of one make in ninety days. Forty per cent of the sales made in rural districts, and fifteen per cent in the cities were made by contractor-dealers.

● DOUBLE THE REGULAR LICENSE fees will have to be paid by Oregon electrical contractors who neglected to take out their state licenses prior to July 15. Up to that time approximately 300 electrical contractors, as well as 998 journeymen electricians, and 672 dealers had taken out state licenses. The license fee for contractors is $20.00.

● COMPTROLLER-GENERAL McCARL has ruled out the so-called "blank check" clause in government contracts which was the administration's effort to continue NRA code requirements in force insofar as government purchasing is involved. Treasury's Procurement Division wanted a blanket promise from bidders to abide by subsequent wage, hour and child-labor limitations proposed in the Walsh bill, presumably with no changes in contract prices. Under the ruling a clause promising modification of the contract to conform to later legislation may properly be regarded only as a request to bidders, not as a command. A low bid omitting this clause is still valid.

● ALREADY MORE THAN HALF a million approval tags have been issued for use on I.E.S. lamps. These lamps are being produced by forty-nine manufacturers.

● A DEPARTURE from standard house wiring methods is made in the Berloy steel frame houses. The wiring, which might easily be a forerunner of what can be expected in metal and prefabricated houses, is carried through sheet steel base boards around the second floor, leading from there to the outlets on both floors with armored cable. This method will be pictured in an early issue.

● ELECTRICAL WORKERS of Reading, Pa., recently came through with flying colors in a test of special mechanical skill. A large local air conditioning job had become delayed for lack of experienced mechanics who could install a large amount of special copper tubing and sleeve fittings, which were a vital part of this job. The Keystone Engineering Corp. of Reading solved the problem by having the job added to their wiring contract, and all is well.

UMI

How the Public of Mt. Vernon Was Sold Safe Wiring

And what this means to the electrical contractors in the way of added business and elimination of bootlegging

Through public education, industry cooperation and coordinated efforts of the building, fire and police departments, it has been possible for Mt. Vernon, a suburb of New York City, in a year and a half to start a new Code, license contractors, secure permits on all electrical installations from one receptacle up, almost completely eliminate bootlegging, and institute reinspection with over 80 per cent compliance. Mt. Vernon is a city of 64,000, covering four square miles, and containing 9,455 dwellings, of which approximately 6,000 are one and two-family dwellings, 1,200 apartment houses, 1,200 commercial buildings, and 75 factories. Because of the average conditions presented by this community, and because the results have been accomplished with the minimum of staff, routine and expense, the editors of ELECTRICAL CONTRACTING are presenting a survey of the actual results, to show how much can be accomplished simply.

EDITORS

AN ELECTRICAL reinspection program has been successfully conducted in Mt. Vernon, N. Y., for the past year and a half despite the fact that this city does not have a municipal electrical inspector. During this period 242 cases of electrical violations were disclosed by reinspections, of which 164 have already been corrected, the balance being in various stages of removal or negotiation. The success of this activity may largely be attributed to the public interest that was aroused through the effective use of local daily newspaper publicity.

The ordinance is administered by the Bureau of Buildings in conjunction with a non-salaried Board of Electrical Control which examines applicants for licenses and hears complaints or appeals by the public. Inspections are made for the city by the New York Board of Fire Underwriters' resident inspector as a non-political and non-biased authority. The city receives no revenue other than the annual license fee.

Electrical inspection is under the building department, which in turn, is a division of the Department of Public Works. The head of this department, Commissioner Richard E. Stinson, has encouraged the Argus, the local daily, to visit his office for news. The paper is informed of everything that is happening in the department. All building violations, for instance, are placed in a tray on the counter, so that the newspaper has free access to them at all times. By thus taking the newspaper into his confidence, the commissioner has been able to educate the public on the safety measures being taken by his department.

The newspaper carried, of course, the news of the hearings and passage of the ordinance, and then the appointment of the Board of Control, but instead of stopping there, the department saw to it that the newspaper was supplied with news of the manner in which the ordinance was functioning.

Mt. Vernon was overrun before the ordinance was introduced, with contractors from other cities. After the ordinance was passed, they tried bootlegging, but as fast as they were caught, the newspaper was informed.

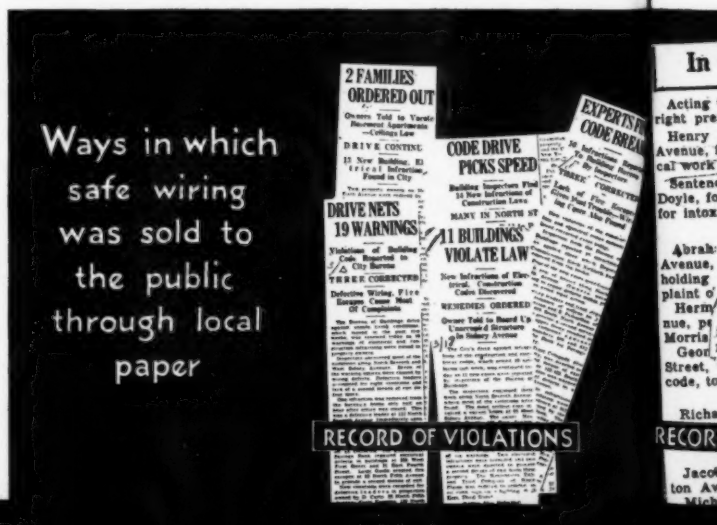
Several attempts were made to secure exemptions from the operations of the ordinance. The newspaper carried the full story, together with the final decision.

Because the ordinance was so new, a large amount of bootlegging took place on the part of property owners and others. As these cases came to light, the news was carried by the paper.

About this time the entire building department became interested in general building safety. The electrical division made a great many reinspections. Whenever defects were found, not only was the owner notified, but the information was given to the newspaper which promptly reported the fact. As soon as the defects were cleared up, the newspaper likewise reported that fact.

Every so often the corporation counsel's office would make a statement that it was about to prosecute offenders who had not cleared up violations. This was carried as news. Likewise all cases presented before the courts for violations of the electrical ordinance was carried as news.

In its reinspection work, the electrical department, in addition to its regular work, concentrated upon groups of structures. The first to receive attention


Ways in which safe wiring was sold to the public through local paper
2 FAMILIES ORDERED OUT
DRIVE NETS 19 WARNINGS
CODE DRIVE PICKS SPEED
11 BUILDINGS VIOLATE LAW
RECORD OF VIOLATIONS

were public institutions, such as clubs and hospitals. Next came oil and gasoline stations. Then theatres, and now a drive is being made on apartment houses. It is interesting to note how some of these groups, particularly certain oil companies and theatres, put up stiff opposition in the beginning, but quickly corrected the violations as soon as the weight of public opinion which had been generated by the newspaper was felt. In one case a theatre, for instance, found its receipts were seriously affected. It did not take this house long thereafter to clear up the defects, and get back in the good graces of the public.

The public has been so educated in this matter, that it is quite common now for a property owner to refuse payment for any electrical work, until the inspection certificate has been received. Building owners dislike very much having their names in the paper as having defective wiring. Their friends and neighbors twit them about it.

All in all, the people of Mt. Vernon have come to respect their electrical ordinance, and the work of the electrical department, with an appreciation of what it is doing for their own safety. Commissioner Stinson is of the opinion that it would have been impossible to create this so nearly 100 per cent observance of the ordinance, had it not been for the co-operation of the local newspaper.

Another factor in helping Mt. Vernon to secure such a high degree of compliance is the excellent cooperation secured from the electrical contractor. The building department has made it easy for the contractors to help.

In the first place, there are no city inspection fees, the only fees being those of the underwriters. Licenses and renewals thereof were purposely made small. Through a reciprocal arrangement with other cities nearby, the contractors who are licensed in any of those cities may secure a Mt. Vernon license at a nominal charge of $5.00.

Secondly, contractors have been urged to report any suspicious electrical work. As all permits are filed by streets, it is not necessary to know anything but the street number when making an inquiry. If no permit has been taken out for the work, the complaining contractor can report it to the first policeman he meets, and he will stop the work.

Prior to the passage of the ordinance, much of the local work was done by incompetent men from various localities who broke prices and did slip shod and hazardous work. The contractors of Mt. Vernon have been made to understand that they can enjoy the protection against raids from such chiseling competitors only if they will cooperate and report all suspicious work.

SIXTEEN PREDOMINATING ELECTRICAL DEFECTS AS CITED IN REINSPECTING 101 JOBS IN MT. VERNON, N. Y.

1—Cord wiring	74%
2—Over-fusing	55%
3—Joints not soldered	51%
4—Armored cable not properly supported	41%
5—Socket shock hazards	37%
6—Armored cable terminals omitted	35%
7—Deteriorated, spliced or defective flexible cords	26%
8—Outlet box or junction box covers omitted	24%
9—Joints not insulated	23%
10—Fixtures pulled or fallen apart	22%
11—Fixtures not properly supported	20%
12—Defective wiring devices	16%
13—Deteriorated fixture wire	15%
14—Unapproved wiring devices	13%
15—Wires not properly supported	13%
16—Wires overloaded (additional to overfusing)	12%

An analysis was recently made of seventeen completed jobs which resulted from reinspection in Mt. Vernon. These jobs ranged from $580 to $5.00, totaling $1,787. Materials involved 37 per cent of this total, while 63 per cent was billed in labor. These seventeen jobs averaged about $105 each.

The principal sub-divisions of materials that went into ten typical small jobs were:

1. Armored cable and connectors
2. Rigid and flex-steel conduit and electrical metallic tubing; connectors, couplings and fittings.
3. Outlet boxes and covers.
4. Supporting materials (straps, expansion shields, screws, toggle bolts)
5. Flexible cords, fixture, and other rubber covered wire
6. Wiring devices and plates.
7. Wire splicing, connecting and insulating materials
8. Fuses
9. Fixtures, parts, and lamps
10. Sundries (patching plaster, saw blades, etc.)

The larger jobs involved such additional items as panelboards, safety switches, fuse cutouts, special cabinets, larger wire sizes, service fittings, meter equipment, etc.

The actual correction of defects as cited above brings the contractor certain additional work, which varies widely in amount with the type of occupancy. None of such additions are included in the above tabulations. One contractor who replaced a hazardous factory serv-

In Court Today
Acting City Judge John B. Cortright presiding.
Henry Hyman, 146 Thirteenth Avenue, fined $10 for doing electrical work without a permit.
In Court Today
Suspended Sentences
Lucile Johnson, twenty, 39 South Third Avenue, disorderly conduct.
Harry Atwell, thirty-three, no home, vagrancy.
David Stele, New York City, doing electrical work without a permit.
Traffic Cases
Richard Wilkens, North Pelham,
Jacob N. Roerbel, 286 North Fulton Avenue, speeding.
Michael DeLuca, 217 Twelfth
RECORD OF PROSECUTIONS
250 Electrical Violations Found Since September
More Than Half Have Been Remedied Through New Control Board in City
FIVE REMEDY INFRACTIONS
6 OWNERS STOP CODE VIOLATION
CITY STUDIES CODE REPAIRS
DEFECTS EQUAL CODE REPAIRS
RECORD OF VIOLATION REMOVALS
2 OIL FIRMS IGNORE CODE
11 BUILDINGS VIOLATE LAW
8 OIL FIRMS GET WARNING
BOARD ENDS 155 HAZARDS
SOCONY AGREES TO END HAZARDS
WIRE CODE VIOLATED, CITY HOLDS
THEATER HEADS CLEAR CHARGES
2 THEATERS GET WARNING; PLAZA MANAGER DENIES MENACE
PLAZA BEGINS WIRING WORK
THEATER HEADS ARE SUMMONED
PLAZA DENIES FIRE MENACE
PLAZA COMPLIES WITH FIRE LAWS
City Warns Two Theaters On Defective Equipment
a
b
HOW THE CASE AGAINST THE (a) OIL COMPANIES, AND (b) THE THEATRES WAS TRIED IN THE NEWSPAPER

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SUMMARY OF REINSPECTIONS

Types of Occupancy	
One and Two-Family Residences	26
Apartment Houses	17
Total Class No. 1 Structures	43
Hospitals	3
Hotels, Gathering Places, Institutions	6
Theatres	5
Total Class No. 2 Structures	14
Gas Stations	3
Industrial Plants	2
Total Class No. 3 Structures	5
Bakeries	2
Department Stores	3
Shoe Stores	4
Beauty Parlors	2
Army-Navy Stores	2
Barber Shops	2
Grocery Stores	11
Restaurants	8
Confectioneries	3
Miscellaneous	2
Total Class No. 4 Structures	39
Total Structures	101

NOTE: The condensed analysis of violations does not show the quantity of violations which pertain to one citation. For instance, a four circuit residence system may have each circuit over-fused, and may have eight defective fixtures. This report therefore only shows these two kinds or types of defects, while the quantity of violations in this case might be enumerated as twelve items. Similarly, the thirty-nine class 4 (commercial) reinspections revealed 238 defects. These are divided into ten major groups which would amount to a large quantity of specific items in buildings which occupy several floors.

Condensed Analysis of 90 Types of Violations in 101 Reinspected Structures Arranged in Ten Major Defect Groups and Detailed for Four Classes of Occupancy

Number of Reinspections	Class 1 43		Class 2 14		Class 3 5		Class 4 39		All Classes 101	
Total and Average Number of Kinds of Defects Involved	305	7	134	9.6	60	12	238	6.1	737	7.3
	Analysis of Typical Violations									
Class of Defects	No. Viol.	% of 305	No. Viol.	% of 134	No. Viol.	% of 60	No. Viol.	% of 238	No. Viol.	% of 737
Wires and cords deteriorated, overloaded, hot, wet, mechanical injury, fire damage, cord wiring	66	22	40	30	16	27	71	30	193	26
Armored cable, conduit, metal raceways not supported, fittings omitted, not grounded, subject to injury, dampness, heat	57	19	23	17	11	18	49	21	140	19
Connections not soldered, taped, protected, lugs omitted	45	15	7	5.25	8	13	27	11	87	12
Wiring devices defective, shock, hazard, non-approved, mechanical injury	41	13	7	5.25	7	12	22	9	77	10.5
Fuses omitted, oversize, not enclosed	23	7	18	13.5	7	12	21	9	69	9
Fixtures broken, fallen apart, not supported, not grounded	25	8	15	11	1	1.25	12	5	53	7
Outlet and junction boxes not supported, omitted, knockouts removed, covers missing, over-crowded	21	7	7	5.25	7	12	17	7	52	7
Motors and apparatus not grounded, improperly mounted, enclosed or guarded	9	3	7	5.25	2	3.5	13	5.5	31	4
Service equipment ground defective switches broken, unsupported, mechanical injury, corrosion	15	5	4	3	....	.....	5	2	24	3
Distribution equipment defective, improperly mounted, enclosed overcrowded, overloaded	3	1	6	4.5	1	1.25	1	0.5	11	1.
	385	100	134	100	60	100	238	100	737	1005

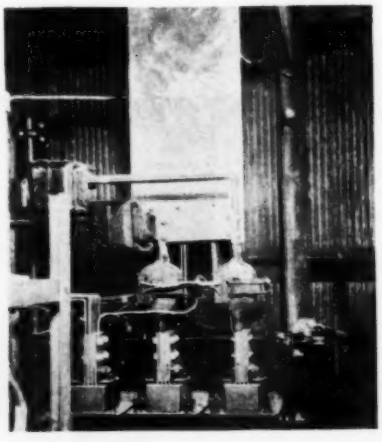
ice for $360, has been able to get all of the wiring in this plant which had formerly been done by their own employees. As a result this contractor has billed them over $2,000 since commencing the original job a year ago.

Another case of apartment house fixture and flexible cord violations resulted in the contractor re-fixturing at a price of $632.00, rather than to attempt repairs to obsolete and flimsy lighting units. This was extra work above the cost of installing approved wiring for convenience outlets that had been wired with lamp cord.

Compact High Capacity Service Entrance

IN replacing an inadequate power service for the welding load in a York, Pa., chain manufacturing plant, a 2,500-amp., 220-volt metal enclosed bus bar service was provided which entered the building through a 9-in. by 15-in. window pane. The mains consisted of two ¼-in. by 5-in. bare copper busses per phase, which projected downward at the outer end of this assembly and provided connections for the power company's service cable drip loops. This compact method avoided the need for installing a series of large entrance conduits and service fittings at this point, each of which would have replaced one of the window panes along the factory wall.

A new 2,500 amp., 3-pole main oil circuit breaker was installed at one end of the existing switchboard by rearranging some of the old feeder panels. The metal enclosure was terminated directly above the line terminals of this main breaker, and the pairs of ¼-in. by 5-in. bus bars were then provided with offsets for direct connection to these studs. This compact feeder permitted this breaker to be installed in a crowded area which would have rendered the installation of several large service conduits difficult. Because of the direct bus-to-breaker stud connections, there were no large lugs to be sweated on. This job was installed by the York branch of the Keystone Engineering Corp., Reading, Pa.



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New Markets for Contractors
in Restaurants

NOVEL electrical features may be sold to the modern restauant or grill that mean increased wiring. An example of such electrical features is found in the Twin Grills at Scranton, Pa., the proprietor of which has expressed his personal views as to their value to his business.

The most important special item is a battery of doors which operate by means of photo-electric cells. A customer upon interrupting the light beam which guards the entrance vestibule need not reach out to push the door open. It has already opened. The same operation takes place when one approaches the exit door. This feature has attracted a great deal of attention, and is considered by the management to be a very fortunate investment in building good will and greater patronage.

Good service means profitable extras on the customer's check, therefore, a Mark-Time tumbler switch with pilot light above is provided at each table. Anyone wishing service may flip his switch, which turns on the pilot and rings a chime. This attracts the attention of a waitress, because the pilot light circuit remains on for 15 sec. before the cycle has elapsed. This feature is claimed to have more practical value than a hostess. The keen operator realizes that many customers dine hurriedly and will often omit the cocktail, dessert, or cigar because no one's attention can be attracted quickly.

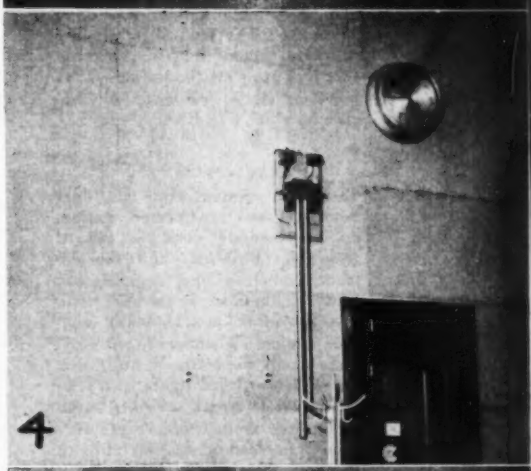
Quick pickups of hot dishes mean satisfied diners. This can't be done with dignity if shouting, or even buzzers are resorted to. However, a four-tone chime provides a pleasing tone at intervals, but conveys its definite message to the staff. Waitresses soon learn to know which girl's order the chef has at hand.

A public address system has been installed for the novel purpose of community joshing by the proprietor from his microphone at the cashier's station. A party that is leaving often receives a surprise farewell via a loudspeaker installed above the entrance. A similar speaker within is used for paging, or to add a bit of spice to a party. In this case it is an investment solely for adding that extra touch of friendliness.

The wiring for the Twin Grills was installed by the Mangan Electric Company, of Scranton.

2

3



4

5

1. Automatic door mechanisms for entrance and exit, which operate from photo-electric cells. A loudspeaker is installed above the doorway which works from a microphone at the cashier's station.

2. The "electric eye" is within this entrance newel post, a similar one being inside for the exit passage.

3. A flush tumbler type "Mark-Time" switch is provided beside the modern wall brackets at each table. This operates the pilot above and an electric chime, to call a waitress.

4. The chime call control is divided for sounding distinct tones for each of the Twin Grills.

5. The chef's "come and get it," four-tone chime helps the waitresses to serve hot food. The loudspeaker serves both Twin Grills, and works from the microphone at the cashier's station.

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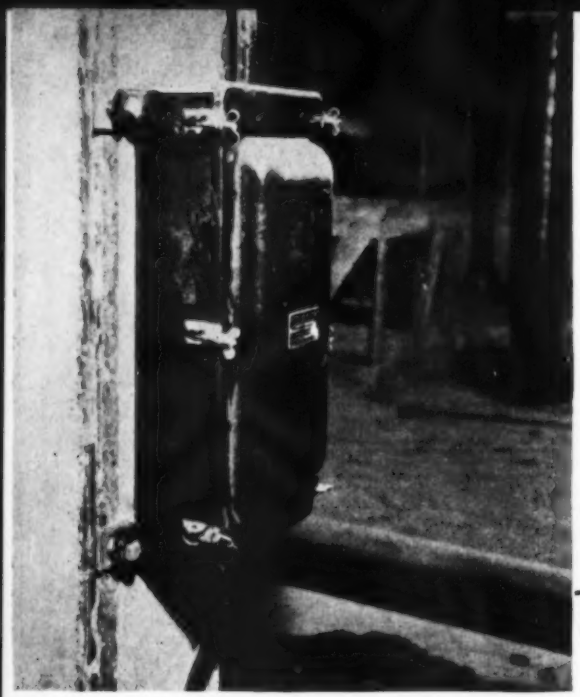
Planned Methods P



1. Control equipment located in pits and otherwise damp places was set out from its fastening surfaces to minimize corrosion of the enclosures. Two ¾-in. by 1½-in. flat iron base straps and short conduit spacer thimbles provided an inexpensive arrangement which shimmed the starter mounting feet about ½ in. away from the mounting surface.

1

THE wiring of a new municipal water plant at Reading, Pa., involved installation methods that required experienced advance planning to insure a favorable final cost. Methods were adopted for this job by the Keystone Engineering Corporation, which handled this contract, that kept costs within the estimate without sacrificing the quality of materials or workmanship.

Bidders who are unfamiliar with this highly competitive class of work will find that it involves a variety of wiring methods and that the structures contain various floor elevations

2

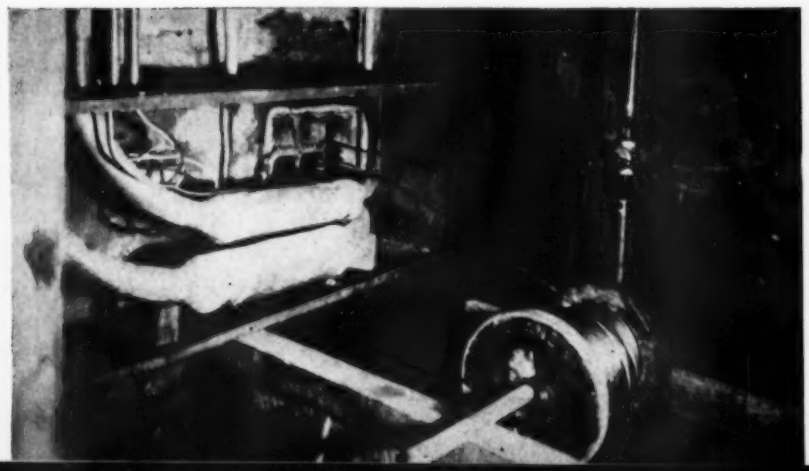
2. Lighting outlets were concealed in the sloping concrete roof over a series of tanks. The various outlet locations were provided with a block of concrete projecting below the slanting form which provided a horizontal surface for the vaporproof outlets. This was done because angular fixture fittings were not considered suitable for this area. Certain projections accommodated two fixtures, for general and emergency lighting, which required careful spotting and bending of conduit runs into the outlet boxes.

3. Pipe space being at a premium, the varying levels had to be followed in routing main feeders to the switchboard. A corner-hugging junction box near the switchboard permitted 500,000 c.m. 4-conductor lighting and 3-conductor power mains being turned at a sharp angle without danger of injury to their lead sheaths. Removable covers on two sides of this box gave maximum access for handling these cables most efficiently.

3

4. A nine-compartment tile duct between the transformer station, an intermediate manhole 100 ft. from the building, and the entrance junction box, contains the lead sheathed main feeders. Numerous sub-feeders lead out from the main switchboard through these ducts to detached buildings, pump houses, yard lights, also telephone and signal circuits. Although the main feeders were continued in lead sheathed cable to the switchboard, their length necessitated splices at the tile-to-conduit conversion junction box. Generous box width made the cable handling easier.

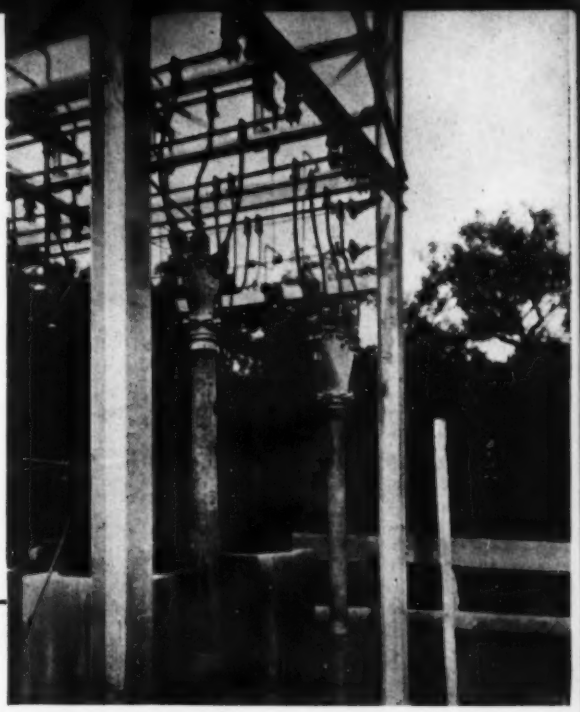
4



Protect Competitive Costs

and galleries from which long conduit runs for the various systems must be carefully coordinated. This particular job included numerous installation conditions which could have resulted in considerable expense had not a definite method been predetermined in each case. Due to the various types of work involved in such jobs, a versatile installing crew was essential.

Some of the time-saving methods that were used on this job are shown. By working out their methods before beginning actual operations, it was possible to avoid confusion, delays and conflicting ideas.



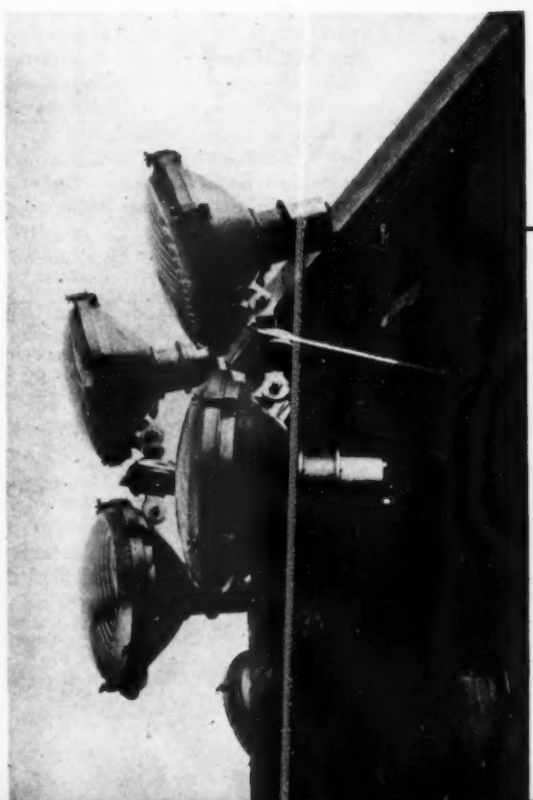
5. The 3-wire power and 4-wire lighting secondary feeder conduits were stubbed up from the concrete mat in the transformer station and terminated in potheads beneath the open secondary buses. Because of their size, these conduits were sufficiently rigid without additional supports being provided.

5

6

6. A compact flush junction box in the screen house contains separate compartments from left to right for: Lighting feeder, telephones, signal system, and power. This arrangement eliminates the cluttering of wall space with four separate cabinets, and saved installation costs because of segregated conduit runs, and the installation of only one box and front. The box is 16 in. wide, 18 in. high, and 5 in. deep.

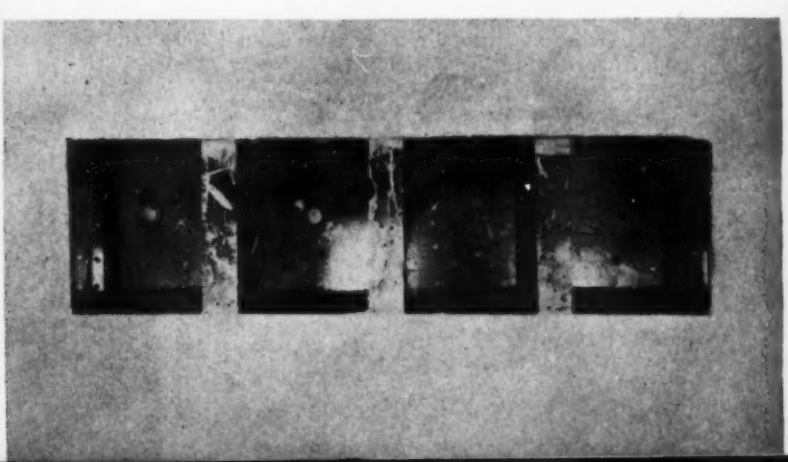
7. Banks of outdoor floodlights which occurred along stone walls were mounted back-to-back upon ¼-in. by 5-in. flat iron walled-in inserts. A minimum amount of racking metal is thus left exposed to the elements, or was required to be made up. A 1¼-in. home run conduit was stubbed out of the wall to the right of the flat iron bracket.



7

8. The concealment of motor feeder and branch circuit runs in the screen house wall required a four-division flush junction box upon which the starters for four motors could be mounted. Vertical steel struts were provided to which the adjoining sides of two starters could be bolted. Adequate rear wiring space permits easy future maintenance, and likewise offers liberal space for pulling long lead sheathed runs.

8



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5-Man Management

A CITY of 70,000, like Roanoke, Va., won't support an electrical contractor organization employing forty-two persons, unless that firm has a balanced plan of management. Likewise that management must function efficiently to cover a general scope of smaller work at fair prices. Which brings up a question: How can one firm obtain enough business at the prevailing market in a community of such size, and attend to all the details that are involved?

J. M. Richardson, president of Richardson - Wayland Electrical Corp., operates such a business under a five-man management combination. Mr. Richardson heads the group which includes a retail sales manager, construction sales engineer, credit manager and construction department superintendent. These five men hold a 30-minute joint meeting each Monday morning to discuss their plans for the coming week and to compare notes regarding related matters of service and the causes of current complaints.

What about the overhead? The retail store is second to none in Virginia; stock rooms for contracting and general supplies are excellent; and a handsome general office suite is maintained on the second floor. However, this represents, in effect, the consolidation of several separate organizations under one roof, all employing the same credit service, the same purchasing and financial supervision, the common use of modern tools and delivery equipment, and all being subject to the guidance of one directing head to assist in planning, selling and buying. Joint occupancy, joint advertising benefits, the common use of regular operating services, all actually tend to make for a net operating efficiency which "debunks" the cry of excessive overhead.

Out of this coordinated activity comes the knack of capitalizing upon every contact with the public. The outside appliance sales force, comprising nine men, reports wiring or repair leads through its sales manager, while the mechanics are likewise ever on the alert for sales leads. An equitable credit is given to the persons who make reports which result in sales.

Small jobs are welcome, and receive the same care that is given the more important operations. Since complaints mean lost good will, what might be passed over lightly as the last wiring job for a customer, still represents a future retail sales prospect, provided satisfactory relations have been maintained by the last department on the job. The price of small jobs is therefore checked to avoid unreasonable or excessive costs so as to represent values in keeping with the work performed.

This firm has done construction work in seven states, rising to a peak payroll of seventy-two persons in 1929. The present staff of forty-two, as compared with a low of twenty in 1933, indicates that Mr. Richardson's key man system can build up a good business in a smaller city. The 1934-35 carry-over of incompleted business amounted to $60,000, which confirms a contention in this organization that efficient department heads do not create a top-heavy business structure.

J. M. Richardson

President, Richardson-Wayland Electrical Corporation

A balanced plan of management enables this Roanoke contractor to capitalize on every public contact.

Labor Costs for Steel Racks and Supports

Variables resulting from designs, importance of detailed estimates rather than lump sum allowances. How quantities and methods affect labor costs.

By Ray Ashley

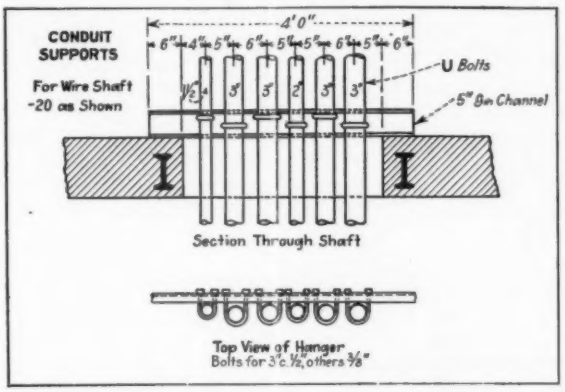
THE wide use of fabricated steel shapes in electrical construction work for control equipment racks, conduit supports and numerous odd purposes necessitates a knowledge of make-up costs. The risk of estimating this important work by making approximate allowances under incidentals can prove expensive. There are reasonably accurate labor units with which costs may be prepared for pricing this work. To these must be added the cost of the materials needed. Rough sketches or more detailed designs will clarify the work of preparing such estimates.

Designs can be made from the reference data contained in one of the good hand-books on steel products. These data will aid the contractor in selecting correct dimensions that provide sufficient "bending moment" to meet the load that is involved. This reference will also prove valuable for substituting steel shapes when the preferred sizes are not available, as for instance, using two L's for a T, or two channels for an H. While the making up of a few racks will reflect only slight variation, the cost of drilling, cutting, mitering and erecting of many steel shapes, if carelessly selected in sizes larger than needed will have considerable bearing on the estimated cost.

LABOR IN MAN-HOURS FOR CONSTRUCTING CONDUIT HANGERS
(See Drawing)

	QUANTITY	HAND TOOLS Unit	HAND TOOLS Extension	POWER TOOLS Unit	POWER TOOLS Extension
Cutting 5-in. Channel	1	1.00	1.00	.75	.75
Drilling Holes ⅝-in.	8	.28	2.24	.20	1.60
Drilling Holes ⅞-in.	2	.24	.48	.18	.36
Drilling Holes ¹⅛-in.	2	.20	.40	.16	.32
Installing Channel in Place	Lbs. 56	.04	1.44	.04	1.44
Painting One Coat	Ft. 4	.10	.40	.10	.40
			5.96		4.87

Note: Above units are based on hangers being made in lots of 10 or more.


CONDUIT SUPPORTS
For Wire Shaft -20 as Shown
4'0"
6" 4" 5" 6" 5" 5" 6" 5" 6"
½ 4 3 3 2 3 3
U Bolts
5" Bar Channel
Section Through Shaft
Top View of Hanger
Bolts for 3 c. ½, others ⅜"

LABOR IN MAN-HOURS FOR FREE STANDING FRAME (See Drawing)

MATERIAL	QUANTITY	BY HAND Unit	BY HAND Extension	WITH TOOLS Unit	WITH TOOLS Extension
Cutting 2-in. Channel Cuts	3	0.30	0.90	0.25	0.75
Cutting 2x2x¼-in. Angle Cuts	20	0.35	7.00	0.30	6.00
Bending 2x2x¼-in. Miter & Bend	4	0.55	2.20	0.50	2.00
Notching Angle (For Overlap)	6	0.35	2.10	0.35	2.10
Layout and Drill Holes (⅝ in. x ½-in. stock)	30	0.27	8.10	0.23	6.90
Layout and Drill Holes (½-in. x ½-in. stock)	60	0.17	10.20	0.16	9.60
Layout and Drill Holes (for ⅜ Exp. Shields Floor)	10	0.50	5.00	0.40	4.00
Assemble and Erect Frame	Lbs. 305	0.06	18.30	0.06	18.30
Painting One Coat	Ft. 124	0.03	3.72	0.03	3.72
			57.52		53.37

Note: The exact units used above are not shown in the table, but are arrived at by slight addition to or a deduction from the unit for the nearest corresponding stock.

Layout Economies

Labor costs will vary to some extent as a result of the selection of materials. Heavier materials may cost slightly more, but in turn save the labor cost involved in providing the additional supports that lighter shapes would require. A heavy trapeze bar, for instance, using two hangers, often is cheaper than a lighter bar with three hanger rods. The additional weight of horizontal channels may permit the omission of numerous drillings and cuts for intermediate rack supports. Likewise, a more rigid frame tends toward more open working space for installing other work more economically, without the obstruction of wall braces, etc.

Free-standing frame designs involve more steel and fabrication work than simple wall-braced or bracket type frames, but such designs must be considered in connection with the cost of other parts of the installation. The free-standing design here illustrated was

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developed for an industrial plant circuit breaker rack in preference to a less expensive wall mounted layout. A considerable economy resulted because the final layout eliminated conduit nipples, and conduit cross-overs. It also provided easier access for connecting the breakers from an overhead busway, and for making up cable connectors.

Tools

There is a variation of from 10 to 40 per cent in the labor costs depending on the available tools. The costs of layout and erection do not vary greatly, but drilling, cutting, and bending vary according to the methods used. The following tools are especially valuable:

Punches, power driven drill press, power driven hack saw, bender on bench.

The value of such tools is all too well known to the contractor, but they are expensive and must be used a great deal to justify their purchase. They are really large-job tools.

It is advisable to go through an estimate, which involves considerable steel work, and sum up the total amount (labor and material) allowed for its construction. Knowing this total, one is often better able to judge whether enough work is involved to justify putting special equipment on the job. Frequently a contractor may gain by taking his sketches to a shop which is completely equipped with machine tools for such work.

Skill of the Workmen

Accuracy and speed in layout and in leveling up the finished material are things which represent the greatest gain from experience. In the accompanying tables, the time shown for drilling includes the time for laying out. It is hard to determine to what extent experience affects the progress of a workman, but based on the observation of several superintendents of electrical construction, an allowance of 10 to 15 per cent would seem ample.

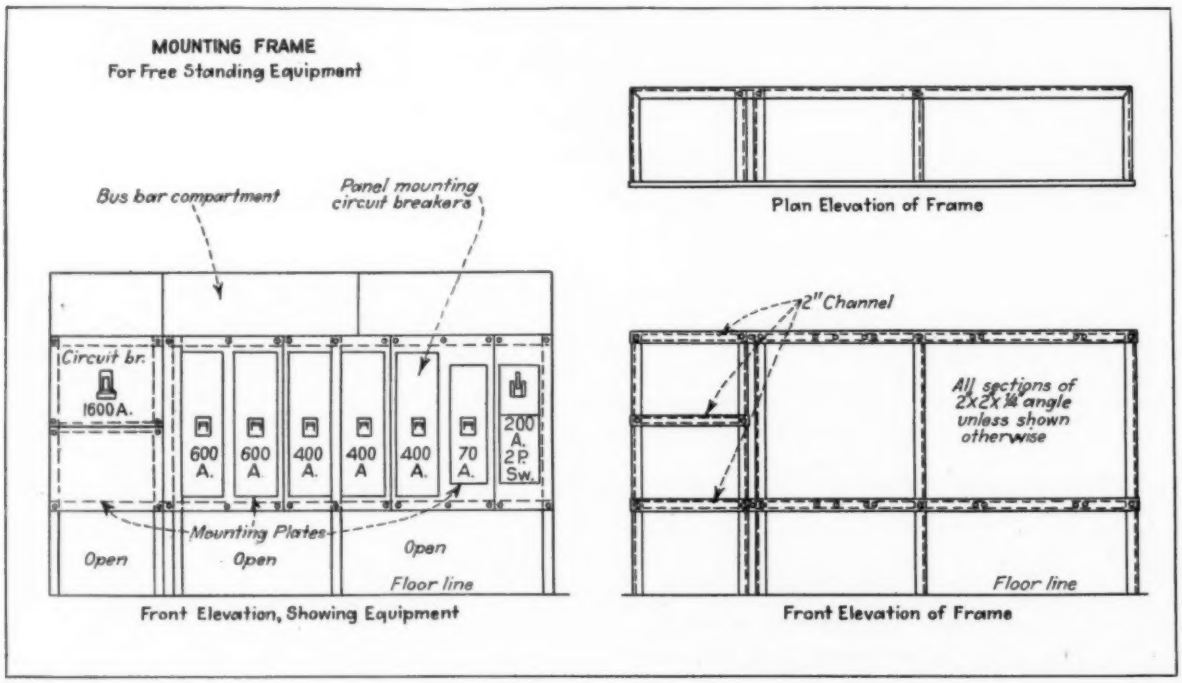
LABOR IN MAN-HOURS FOR FABRICATING STEEL

STOCK	CUTTING By Power Hand Saw		BENDING Vise Bending Tools		DRILLING HOLES By Hand ¼	⅜	½	⅝	Power Tools ¼	⅜	½	⅝
BAR IRON												
1x⅛	.18	.18	.16	.14	.17	.21	.25	.30	.16	.18	.20	.22
1x¼	.20	.20	.18	.16	.19	.25	.30	.35	.17	.20	.24	.26
2x¼	.28	.25	.24	.20	.20	.26	.31	.36	.18	.21	.25	.27
3x¼	.37	.34	.32	.26	.21	.27	.32	.37	.19	.23	.26	.28
ANGLE IRON												
1x1x⅛	.25	.24	.40	.35	.18	.22	.27	.32	.17	.19	.22	.24
1½x1½x1¼	.38	.36	.55	.48	.21	.27	.32	.37	.19	.24	.25	.28
2x2x¼	.45	.40	.65	.55	.22	.28	.33	.38	.20	.25	.26	.29
2½x2½x¼	.54	.45	.75	.62	.23	.29	.34	.39	.21	.26	.27	.30
CHANNEL IRON (Structural)												
2-in.—⅛in. web	.30	.27	.50	.95	.18	.22	.27	.32	.17	.19	.22	.24
3-in.—¼-in. web	.50	.44	.85	.75	.22	.27	.32	.37	.21	.26	.27	.30

Add to the above 0.08 man-hour per pound for assembling. The units for bending angles and channels include the time required for mitering.

Unit-Weight Costs

Regardless of where or how the work is performed, the contractor should keep a record of his costs, for use in future estimating. Some estimators have units figured out on the basis of weight. The units used by various estimators depend on the class of work they are in the habit of estimating. For small jobs these units range from 0.15 man-hour to 0.20 man-hour per pound, for the steel completely installed. These units may seem high, but accurate cost data proves them to be conservative, and for rapid estimating they are very valuable.



Home Remodelling *in the* Modern Manner

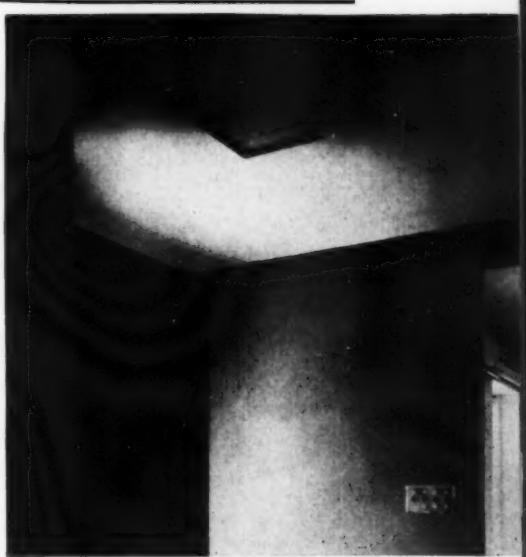
Built-in coves at two sides of the living room and dining room will provide soft illumination of walls and ceiling in harmony with modern built-in furniture.

IN remodeling a fine residence at Harrisburg, Pa., for Mary Sachs, well-known business woman of that city, certain modern touches were given the electrical system that involved about $800 additional wiring. Although this home was considered quite adequately wired by the Snyder Electric Company when it was built, the changes and additions that have just been completed by this firm were needed to provide modern features of lighting and control in keeping with the modernization plans of a new owner. Here, then, is an example of modernization possibilities in old homes of practical value.

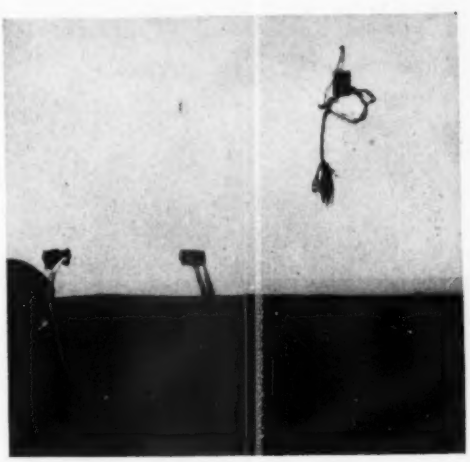
This home had originally been wired in rigid conduit, which included an underground service conduit that was sufficiently oversize to allow the installation of new service wires to carry an increased load.

The original master switch control feature was also re-vamped so as to work in conjunction with the changes that were made. This feature was more readily adapted to the modernized system because of the existing raceway wiring installation, which permitted the necessary control conductors being re-routed without too much disturbance to the walls. Moreover, the introduction of new three-way and four-way switches at most convenient locations about the house was more readily accomplished, due to this flexibility within the concealed conductors.

Some of the items which were added to this home were: 20 three-way and four-way switches; 50 convenience outlets (floor and baseboard types); living room and dining room coves; flush lighting panels in vestibule and passageway ceiling; electric range; kitchen ventilator; special flush ceiling trough lighting; heating and air conditioning equipment; out-door protective lighting; maid's call system; and picture illumination. Although this home is of moderate size, the complete system now comprises twenty branch lighting circuits.



Small areas, such as the entrance vestibules and passages, were provided with recessed lighting units. Additional switches for providing maximum convenience of control are grouped in logical positions.



Left: Modern built-in furniture requires exact outlet locations. These master bedroom outlets are spaced to match the head of a bed which was not yet assembled. The outlet at lower left is for the bed lamp; lower center, telephone; upper right, master switch; and top right, servants' signals.

Right: Kitchen walls that are to be easily cleaned can have few obstructions. Here the servants' signal annunciator has been made flush and the exhaust fan has been installed in an air shaft, to exhaust fumes from above the range. Local lighting has been provided above the range, in addition to three kitchen lighting outlets.

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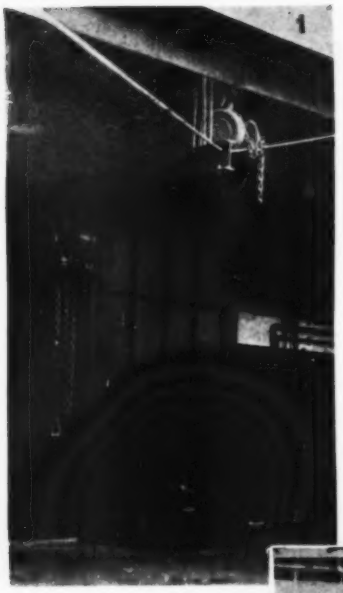
Adequate Hoisting Layout



HOIST AND TRACK SUMMARY

HOIST	TRACK LENGTH	PURPOSE
A	30 ft.	Receiving Dock
B	18 ft.	Cleaning Platform
C	6 ft.	Cleaning Platform
D	36 ft.	Main Work Space
E	32 ft.	Lathe Aisle
F	16 ft.	Drill Presses and Milling Machine
G	24 ft.	Repair Benches
H	33 ft.	Winding Benches to Ovens
I	8 ft.	Rear oven

8 Spare Utility Hoists from ½-ton to 3-ton Capacity

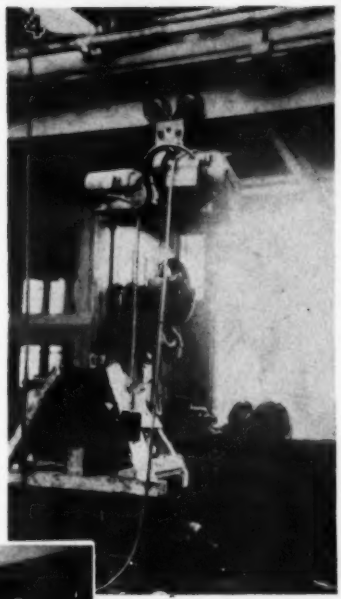
IN designing a compact shop layout that would be most efficient for a widely diversified class of heavy industrial motor work, Venino Brothers & Company, Inc., of Newark, N. J., gave particular care to the hoisting problem. The shop has an area of about 3,500 sq. ft., yet in this space there are nine separate I-beam tracks overhead, each with its movable chain hoist, ranging from ½-ton to 4-ton capacity. Two of the

1. A 4-ton electric hoist and 30-ft. track is provided at the receiving dock, from which point the equipment is taken to the shop, about 5 ft. below the dock level. A spare hoist is kept at this point for emergencies. The slanting track in the right background allows incoming motors to be taken out of a truck and rolled to the cleaning dock. When cleaned, they can be placed on a shop dolly by means of a short track and hoist within the cleaning room.

2. Equipment that must be cleaned under air pressure is brought by dolly, or by overhead hoist to the cleaning room, where a short track and hoist is provided within the room for placing the equipment on a steel deck which is level with the receiving dock. This permits this work to be done outdoors in moderate weather, away from the other workmen.

3. A 32-ft. track and hoist is provided above the lathes, and parallel with the main handling area track.

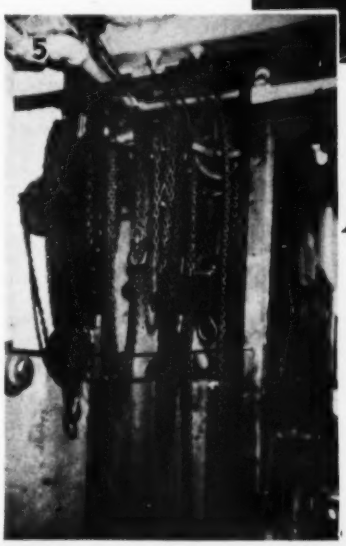
for Crowded Shops



hoists are electrically operated.

A total trackage of 203 ft. is in use, varying in sections from 6 ft. to 36 ft. in length, depending upon the purpose for which each section is used. In addition to the individual hoists that are used on each track, there are eight additional hoists for general utility purposes, wherever they may be needed.

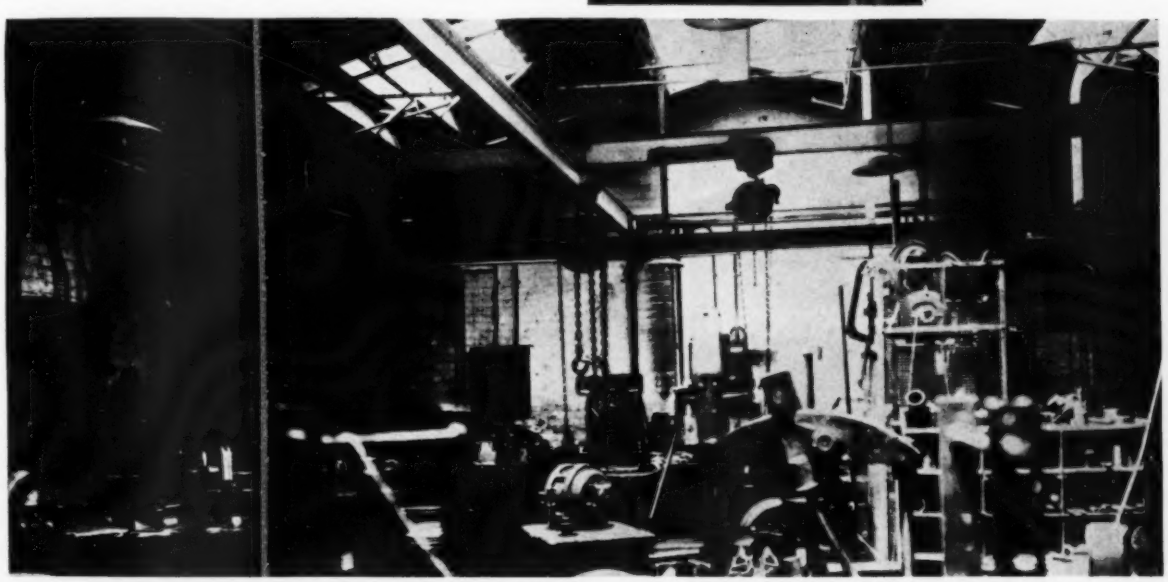
Heavy equipment can be handled at any point in the shop with minimum effort and without disturbing other mechanics to lend a hand. Likewise, there is never a delay in any part of the shop due to waiting for another department to release a hoist. Any piece of equipment that is too heavy or cumbersome to be manually lifted may readily be hoisted to the lathes, drill presses, milling machine, repair benches, winding benches, dipping tanks or ovens.



4. The main floor area that is used for crating, assembling and general inspection of large equipment runs at right angles to the receiving dock and track. This area is provided with a 36-ft. track and electric hoist for loading equipment upon shop dollies and shipping skids.

5. Spare hoists for extra lifting jobs in remote parts of the shop are kept handy upon an angle-iron rack at one end of the shop.

6. The winding department at the left is provided with a 33-ft. track and hoist which leads to two ovens at the opposite end of the shop. One oven is of the top-cover type and is centered under the track. The second oven has an auxiliary track and hoist, which permits equipment to be removed from it while the main track and hoist is otherwise engaged in the winding department. The first crosswise track in the extreme background is over the repair benches. This allows heavy starters or motors to be handled with ease and with no delays while other workmen have need for the other track above the drill presses.



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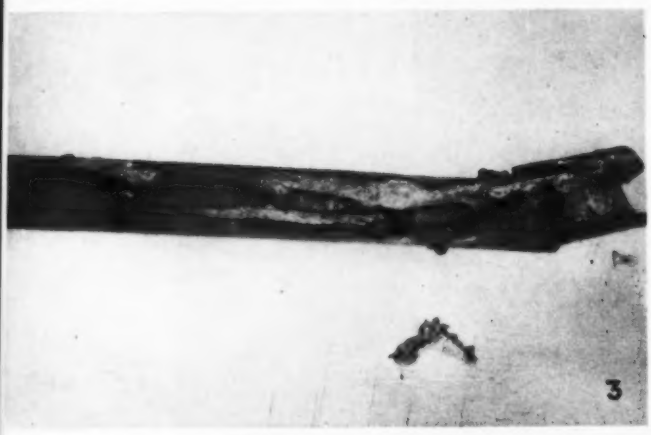
Defective

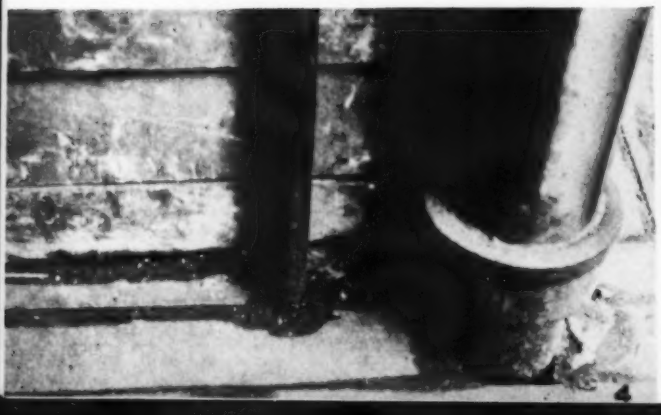
Exposure to the weather, bumps, dogs, etc., causes deterioration in service entrances. When services become defective, they offer a hazard to playing children, a fire hazard and an interrupted service hazard. In the case of a store, this latter hazard might be rather costly in comparison with the cost to correct the defect.

The correction of defective services not only offers an opportunity to do this work, but also to gain an opening to inspect the entire wiring system.

1. A theater and several shops are served by some of this assortment of wires. An insulation fire could travel a considerable distance along the building due to bracketed conductors. Service drop emergency cut-off would darken a large revenue-producing area. VIOLATIONS: NO. 1—3—8—9



2. Corrosion at the ground or sidewalk level, especially on a permanently shaded side of a business building requires greater care in installation. These heavily corroded conduits extend to the basement through wood trim. A breakdown in the trapped sweeps of these service conduits could cause an arc that would start a serious fire, as two stories of tenements are above this store. VIOLATIONS: NO. 7—10



3. When service conductors break down, they must depend for relief upon the nearest incoming net-work or transformer fuses to function. This 2-in. apartment house service conduit, containing three 2/0 cables, was consumed for about 24-in., also a portion of the malleable angle fitting, without fuse relief. An emergency crew made a "hot" cutoff, after firemen were unable to smother the insulation fire, or the sputtering arc. The cause was a broken conduit fitting near an apartment house coal chute, filled with fine coal dust. Chemical action is claimed to have consumed the insulation. A fireproof wall prevented further losses. VIOLATIONS: NO. 2

4. This 1-in. service conduit for a large tenement house was almost rusted through at the point where it extended through the wood floor to its basement service switch. Children play around here all the time. VIOLATIONS. NO. 7

5. Loose service conduits needing only some strapping to prevent them from falling. VIOLATIONS: NO. 4—6

6. When the covers are rusted off of the angle fittings the service wires are left permanently exposed to weather, often as in this case, right at the ground level. A ground current arc in this fitting could easily set fire to this shingled-wall, two-story residence. VIOLATIONS: NO. 3

UMI

Services

10 Common Service Entrance Defects

1—Broken entrance fittings
2—Broken angle fittings
3—Conduit fitting covers rusted away
4—Conduit hanging loose on wall
5—Conduit crushed, or broken off at couplings
6—Conduit supported by service wires
7—Conduit rusted away at ground level
8—Conduit rusted away at building wall
9—Conductors too close to ground
10—Conduit installed with water pockets or traps

7. The rusted away angle fitting cover on this tenement service conduit run spells trouble ahead. Scrub water has made inroads upon the conductor insulation. VIOLATIONS: NO. 3

8. This practically new factory lighting service has already become the victim of a hard bump. The angle fitting is broken in two, its sharp wall having pierced one conductor. How long will it remain in service before repairs are made? VIOLATIONS: NO. 2

9. A total of six power and lighting service conduits congregate at this corner of a group of shop buildings, none more than 9 ft. above the ground. The hazards of 220-volt ground currents, cross connections, service failures and fires are apparent. VIOLATIONS: NO. 1—4—6—9

10. The overhead-underground sidewalk type of service is common in some localities. There is a distinct element of life hazard in the likelihood of "live" conduits being presented to children playing on the streets, as with this 1-in. service which is almost rusted away at the concrete level. Although a practically new pole is well cemented in beside it, nothing was done to induce the owner to replace this defective service at that time. VIOLATIONS: NO. 7

11. Watch the narrow alleys for injured service conduits. Here is a ½-in. 2-wire poultry store lighting service that has been torn loose from two of its straps. The entrance fitting has been temporarily shoved between the drip loops below the secondary brackets, where it now hangs for lack of support. VIOLATIONS: NO. 4—6.

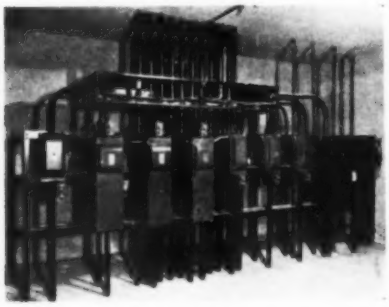
12. A busy grocery store with its stock of mechanically-refrigerated perishables is dependent upon these pinched service wires. A 25-ft. long, ¾-in. service conduit without support-straps has fallen against the iron insulator bracket, breaking off the top half of the service cap, thus tightly wedging the service wires between metal surfaces. Breakdown of this service will occur sooner or later at the wedged-conductor point, or further down, due to water leakage into the open end of conduit. VIOLATIONS: NO. 1—4—6

UMI

Construction . . Methods . . . .

Back-to-Back Starter Rack

An angle iron rack was made up for supporting fourteen magnetic across-the-line starting switches in back-to-back arrangement by the H. N. Crowder Jr. Company, of

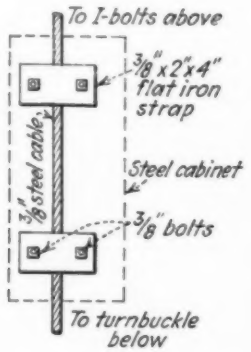


Allentown, Pa., in the finishing mill of a large cement plant. This arrangement provided a 3-ft. clearance at the rear wall and permitted this large control group to be piped in a neat manner by correctly routing the various feeder and control conduits through an overhead junction box. A maximum amount of cleaning space was provided for the dust which is expected to accumulate, but without taking up an excessive amount of space.

Pre-Setting Panel Board Cabinets

An inexpensive method of installing cabinets in steel frame buildings ahead of all conduit work consists of supporting them with vertical messenger cables. A pair of cables is secured at an upper floor to the steel members of the riser shaft by means of I-bolts. They are then made fast and plumb at the bottom with turnbuckles. This arrangement provides a perfectly parallel support on all intermediate floors in readiness for the cabinets, without further measuring. The cables are clamped to the sides of each cabinet with heavy flat iron plates, using a bolt on each side of the cable, and a plate at both the top and bottom of each cabinet sidewall.

This temporary installation of cabinets allows the complete installation of various feeder and branch conduits into all cabinets without the



need for nippling-in operations. In wiring a large Philadelphia building, the H. P. Foley Company, Inc., installed two sets of these supports, since the large number of floors made it advisable to support the upper floor cabinets on a second set of cables.

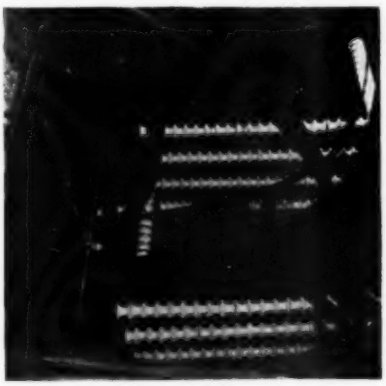
Truck-Type Tower

A small truck was equipped with an adjustable work-tower by Whitson McKay, Inc., of Garden City, N. Y., for installing several Long Island traffic lighting jobs. Four 2½-in. conduit posts were bolted to the sides of the steel truck body. These posts were "X-braced" at the

sides and cross-braced at the top with ¾-in. by 1½-in. flat iron. The upper section, which includes a wood platform, has four legs which telescope into the large bottom posts. Bolts may be inserted through these telescoped pipes at various platform heights. Conduit couplings were welded to the corners of the platform to serve as sockets for the U-shaped ¾-in. conduits which are used as protective railings for workmen. Whitson McKay, the designer of this equipment is standing by.

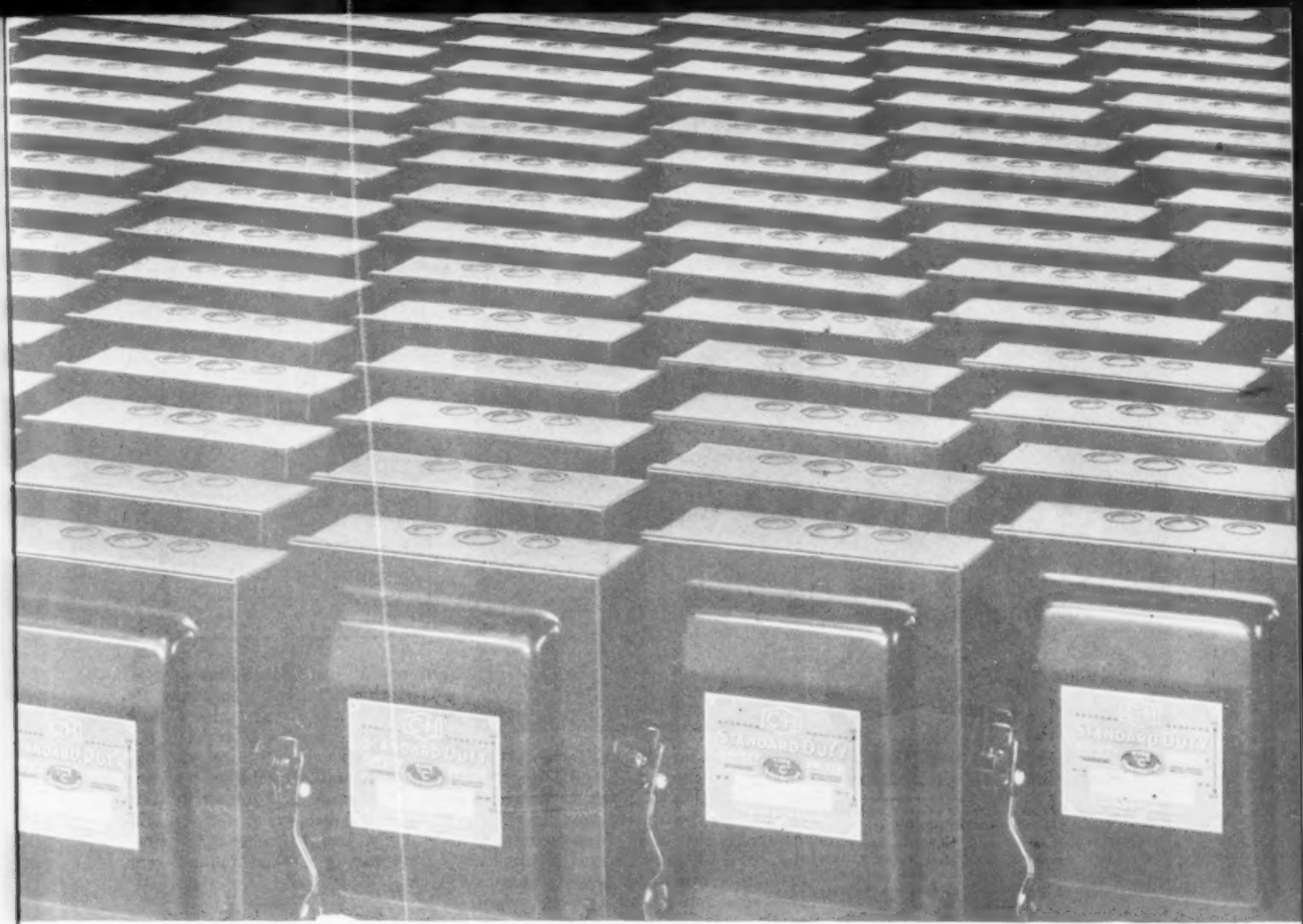
Cable Racks for Large Pull Boxes

A handy cable supporting method for use in large pull boxes permits ease of reefing large cables to their respective positions, ease of replacement during maintenance or alterations, and protection against exces-



sive sagging, abrasion, or pinching of insulation walls. Horizontal rows of porcelain grooved spool insulators are spaced upon short lengths of pipe, which in turn are secured at the ends to vertical angle iron struts within the pull box. The spool racks are spaced in tiers for the required number of decks of cable, so as to provide about 3 in. of clear space between decks.

The pull box illustrated in this article was installed beneath the floor, and in front of two feeder switch boards which are erected in an L-shaped arrangement. To protect the angular cable bends at the openings to the raceways, which connect other boxes mounted below each board, hollow fibre tubes were slotted lengthwise to fit these sharp corners. This left 270 deg. of the tubing radius intact to provide a round and smooth overlapping corner molding of insulating material on all four sides of such openings. This method is employed by J. Livingston & Company, for the Rockefeller Center building group, New York City.



PERHAPS THE OUTSIDE DOESN'T MATTER MUCH

PERHAPS the important thing is what's *inside* a Safety Switch. And so, it may seem only mildly interesting to hear that the semi-dull C-H finish can be applied only to No. 1 grade steel, and that while a penny bares the metal when scratched over a switch with an ordinary enamel finish, on a C-H switch the finish is scarcely marked.

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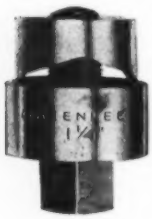
Hydraulic Conduit Benders

Greenlee Hydraulic Conduit Benders insure profits, because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire and cable. They are easy to take to the job, too, because they are readily portable.



Knockout Tools

Greenlee Knockout Punches and Cutters are time savers and profit makers, because they make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without any reaming or filing.

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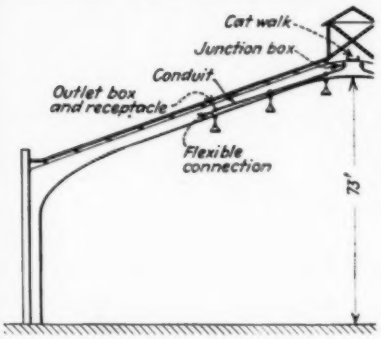
Junction Box for Low Ceilings

In remodeling a chain store at Reading, Pa., the location of two main distribution panels provided very little ceiling space above them for installing the main feeders and the outgoing subfeeders. To overcome this cramped condition, the

Keystone Engineering Corporation, local contractors, designed a slanting cover junction box which provided access to the entire box interior. Although the main feeders entered the back of this box, with nipples extended downward, horizontal runs outward, and a run into the right side of this box, a maximum amount of clear space was available for handling the various heavy conductors. The box was 24 in. wide, 15 in. high, and 12 in. deep at the ceiling level, and the screw cover was 24 in. by 14 in.

Wiring High Ceiling Trusses Before Erection

A $1,200 scaffolding cost was avoided in wiring the Dexter Park Pavilion, Chicago, by installing the ceiling outlet wiring upon the steel trusses before steel was erected. After the Chicago stock yards fire this replacement structure was designed with an amphitheatre which will seat 12,000 persons. The exhibition ring is lighted with sixty fixtures which are suspended from the arched roof trusses, with their outlets located from 60 ft. to 73 ft. above the arena floor. Twenty trusses were completely wired on the ground before erection, each with three outlets in a single run of conduit equipped with a junction box at the upper or roof peak end of the truss. A monitor roof section at the peak provided a runway or catwalk lengthwise of the amphitheatre from which the home run connections to the twenty truss conduit junction boxes were easily installed after the steel work had been erected without the need of ladders or scaffolds. The runs of conduit were installed within the recess or web of the roof truss, which protected the installed conduit against mechanical injury during steel erec-



tion operations. Each truss outlet was equipped with a receptacle for plugging in the fixture, also a hook on the bottom of the truss for a readily removable fixture support. A professional scaffolding company which estimated this job would have charged $20 per outlet for scaffolding alone, had the above described ground wiring method not been employed.

Lubricate Underground Conduit Runs

Much time and hard pulling may be saved if underground conduit runs are first given a thorough lubrication before pulling in the lead sheathed cable. Before pulling in a 100-ft. underground service cable, consisting of three No. 4's lead sheathed, Frank E. Baldwin of Wilkes-Barre, Pa., had the conduit swabbed with cup-greased rags. The run was then fed in off the reel jack at the pole by one man, while another did the pulling with little effort. This run was installed in less than 10 min. In addition to ease of pulling, Mr. Baldwin also claims that the lubricated sheath is less likely to be injured by burrs or grit in the conduit.

Last-Minute Conduit Changes

After a ¾-in. vertical switch-leg conduit had been stubbed up and bricked in at the 3-gang switch box in the foreground, a change was made which required the first ceiling outlet to be dropped below to a

1¢
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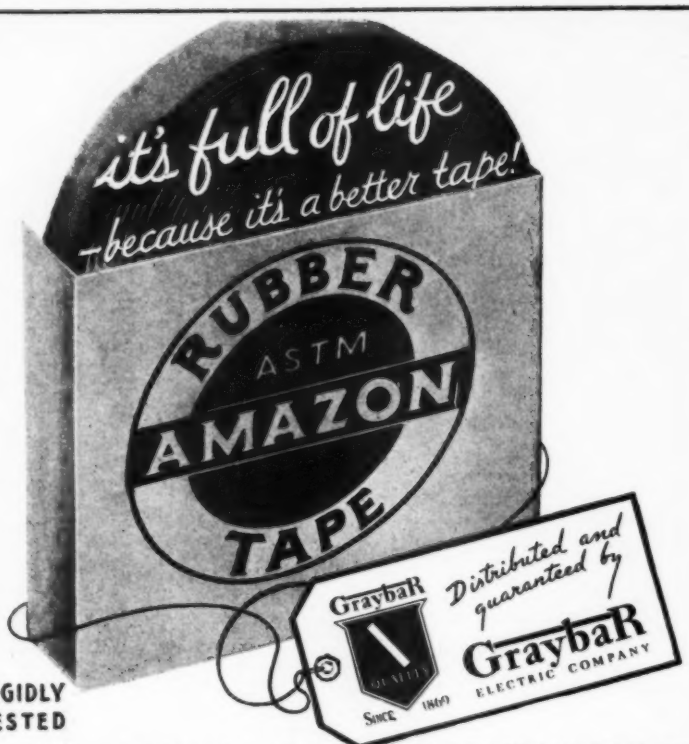

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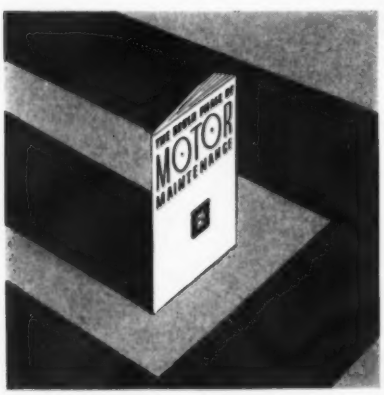

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mezzanine floor which had been added to the Port Washington, N. Y., Post Office. To meet this changed layout, Geo. H. Cocks, Jr., the local contractor, cut into the vertical riser conduit, inserted a 4-in. square junction box, and extended a horizontal ½-in. conduit around the masonry at

the upper left so as to stub out at the correct height into the center of this new ceiling space. The junction box which was added will be fitted with an extension ring to bring the outlet flush with the finished wall.

This method saved abandoning the installed conduit, and likewise eliminated exposed conduit runs, or the unsightly appearance that would have resulted from channeling the finished face brick.

Correction Notice

An article which appeared on page 24 of our July issue, "Outlet Supports for Fabricated Steel Joists" incorrectly referred to the use of "octagonal concrete boxes" in a Long Island High School job. The editors are indebted to the Knight Electrical Products Company, Brooklyn, N. Y., for correcting this description, because the Knight "Hung Ceiling Box" was actually used in this particular case. Although the box appearing in the illustration appears to be similar to a concrete box, there are certain patented features of the hung ceiling box, which differ from the former type. These features adapt it for the specific use for which it was named. Slots are provided in the box sidewalls for hanger bars; the ears for nailing the boxes to concrete forms are omitted and the back of box provides a rigi mounting for the fixture stud whic cannot become loose or disengaged. This latter feature is necessary n hung ceilings because there is no concrete fill to cast the box cover nd stud into fixed position.

Who ARE YOUR PROSPECTS FOR TIME SWITCHES?

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2. Ice machine defrosting
3. Apartment house lighting control
4. Beacon lighting control
5. Floodlighting control
6. Airport lighting control
7. Traffic lighting control
8. Billboard lighting control
9. Electric sign control
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11. Display window lighting control
12. Poultry house lighting control
13. Blower operation control
14. Automatic stoker control
15. Motor control
16. Oil filter control

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Service Shop... Practice.....

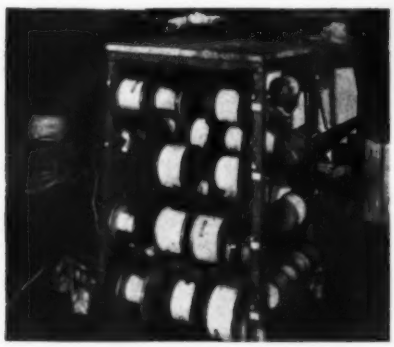
Storage Racks for Coil Forms

There is no time lost in searching for coil forms, or in making duplicates of forms which may become covered up, in the shop of George M.

Jones, Scranton, Pa. Over 250 different forms are kept in orderly fashion and readily accessible, by providing an inexpensive set of wall shelves for them.

Mobile Magnet Wire Rack

In order that smaller sizes of magnet wire might always be close at hand for various winding jobs, and to save time in finding the correct spools, a mobile spool rack was made by Moy and Bradbury, The Elec-



trical Repair Shop, Hazleton, Pa. An angle iron rack was equipped with washing machine casters and a wooden top. This outfit may then be moved about at will, and tools or motor parts placed on the top. A total of sixteen horizontal solid iron spool rods, each wide enough for four spools, provides a capacity for sixty-four different kinds of wire. The face of each angle post has labels pasted on it to indicate the sizes of wire upon the spools, these varying from No. 20 to No. 36 in different types of insulation.

Oil Burner-Heated Bake Oven

An oven for baking and drying out motor and transformer windings which provides about 340 cu.ft. of space was recently constructed and put into use by the Charlotte (N. C.) Electric Repair Co. A down draft

air circulating fan is fitted into a large duct on top of the oven to distribute the hot air from an oil-heated furnace compartment or air chamber located at the back of the oven. An overhead I-beam and traveling hoist permits one man to remove heavy units from a nearby dipping vat, and transfer them to the oven door upon a heavy truck. Truck rails are provided in the concrete floor from outside the oven to the back wall to facilitate rolling the loaded truck in and out.

A standard cast iron furnace radiator and fire pot is used, equipped with an oil burner. Automatic thermostats in the oven and in the furnace radiator prevent the occurrence of excessive or injurious temperatures. A 24-hour chart temperature recorder provides a daily graphic record of oven operations. The circulating fan forces the hot air toward the oven floor thus diffusing it to the elimination of "dead spots."

This oven is 7 ft. 6 in. high, 6 ft. 6 in. wide, 11 ft. 6 in. deep, overall, of which 4 ft. in depth is taken up by the air heating chamber. The door is 46 in. wide and hinged at the left side. The oven walls are double sheets of steel with a 2-in. wall of magnesia block insulation to retain the heat. The fan is suspended within the oven upon a vertical shaft, and driven by a ball bearing motor with a v-belt. A boiled-in-oil wooden block bearing is provided on the lower fan shaft bearing within the oven. Four small damper-controlled ducts extending through the roof lead off the oven fumes.

Storing Small Work-in-Progress Parts

A handy system of numbered metal trays and stamped metal tags is used in conjunction with a novel storage rack arrangement that prevents the misplacement of disassembled motor parts in the shop of J. C. Neuhauser, Lancaster, Pa. Forty-two triplicate sets of consecutively numbered metal

tags are available for use on current repair jobs. These are kept, when not in use, on a numbered peg board, at the head of the tray storage shelf aisle: When a motor is taken apart, a triplicate set of metal tags is taken off a peg. One tag is attached to the rotor or armature, another to the motor frame, and the third tag is attached, together with the shop work order tag, to the metal tray that con-

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Modern Jefferson Super-Lag Fuses protect TIME. They do not blow the moment current rises—do not stop the motor if the overload is only temporary. But they operate positively before the overload has time to become dangerous. It is this "wait" which gives the motor a chance to recover speed—which eliminates needless STOPPED TIME.

Jefferson Super-Lag Fuses are made in both knife-blade and ferrule types, in all capacities to suit every customer need. Speed up fuse sales by selling TIME protection along with motor protection.

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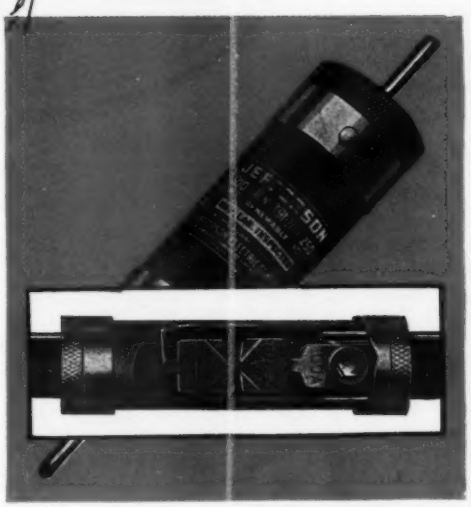

The secret of Jefferson Super-Lag performance is in the lag plate on the Super-Lag link. This plate delays the normal fuse action, provides a time interval or lag by absorbing temporary heat rise. This time-lag prevents the fuse from blowing on harmless temporary overloads —saves needless STOPPED time and link replacements.

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Shop Practice, From Specifications to Completed Sign.
Designing the Sign.
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tains the remaining parts. When the repairs are finished, all the correct parts of a motor can be readily identified and taken to the assembly bench.

The tray storage shelves are numbered to permit the trays being kept in definite berths or spaces, thus eliminating any loss of time in finding a tray that goes with a certain numbered motor frame and armature. The top shelf board has been stenciled with berth numbers for all compartments or tiered spaces below. This was done because the stenciling would become soiled at lower levels and would not be as easily readable, on account of order tags hanging over the edges of the shelves.

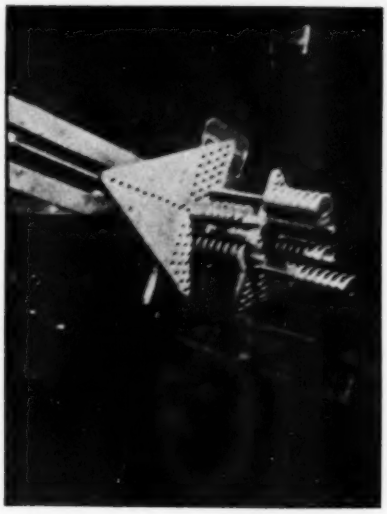
Record Card for Motor Starters

Since "stray" starters so often accumulate in large used machinery stocks, the Roland Electrical Company, Baltimore, Md., keeps a card file record of all such equipment apart from the motor. A 6 in. wide, 4 in. high printed and ruled card is used which provides space for inserting twelve details of design. Additional ruled spaces are provided for recording the make, cost, selling price and remarks.

H.P.	VOLTS	CYCLE	PHASE	MAKE
N.V.R.	O.R.	PUSH BUTTON	NEW or USED	
TYPE	SERIAL NO.	STYLE NO.	FUSE	
COST		SELLING PRICE		
REMARKS				

Adjustable Form for Diamond Coils

A 6-groove spool form that may be adapted to a wide variety of diamond-shaped coils was made by Stokes & Mitchell, Easton, Pa., for use on a standard winding machine head. Two flat triangular steel face plates were each drilled and tapped for one horizontal row of fourteen spindle positions, and four vertical rows varying from ten to sixteen positions. Threaded spindles equipped with a slot and a lengthwise spool keeper spring may be threaded into these face plates for the desired coil shape. The two multiple spools which form the extreme ends of the coil have half their flanged circumference ground off. Thus when the tension of one triangular face plate has been released with the winding head socket wrench, the flanges of these end spools may easily be rotated toward the coil axis. This allows greater freedom for the quick removal of wound coils.



Storage for Small Magnet Wire

An inexpensive wall shelf was built by J. C. Neuhauser, of Lancaster, Pa., to accommodate a wide assortment of types and sizes of small magnet wire. Case lots of wire are kept in the main stock room, and only individual spools are placed in the shop as required. This method permits a neat arrangement of the shop supply and also saves time in locating the material for each job.

Cartons for Small Armatures

Separate cartons are used for storing small armatures in the J. C. Neuhauser shop at Lancaster, Pa. Each of these long, narrow paper cartons has its contents identified with a neatly printed firm label which describes the type armature within. Thus, the finished spare units are kept clean and orderly upon shelves, where they are not subject to damage, and where they can be quickly located for rush orders. This firm is engaged in refrigerator and automotive electrical repair work for which it has acquired a reserve stock of new and reconditioned armatures for giving quick replacement service. Believing that quality workmanship deserves equal care in handling the finished product, this neat packaging plan was developed.

Rack for Paper and Linen Rolls

A steel rack which has a capacity for fifteen assorted rolls of insulating material, such as oiled linen, fish paper and canvas ducking, has been erected adjoining the bench shears

in the Berks Engineering Company shop at Reading, Pa. This compact rack permits the desired grade of materials being kept available for quick measuring and shearing without spoilage or without wrestling with rolls of material that others might have left in the way.

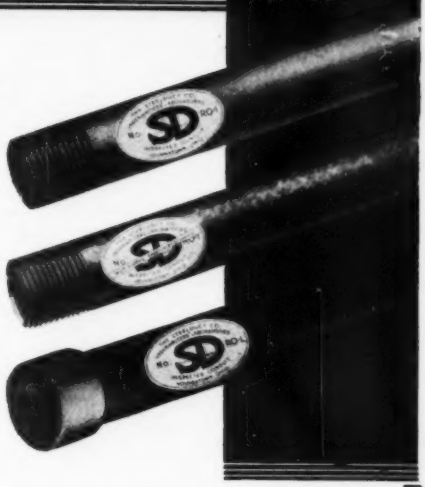
The rack stands 6 ft. high, is 46 in wide and 22 in. deep. A welded frame of 2-in. by 2-in. angle iron was provided with a solid wood deck at the top. The rolls are kept on ½-in. solid round iron rods which lie in slanting slots that were cut into the flanges of the angle iron posts.

STEELDUCT CONDUIT

A Complete Line of

RIGID ELECTRICAL CONDUIT

To Meet Every Conduit Need



STEELDUCT offers three types of finish for Standard Rigid Conduit:

HOT-DIP GALVANIZED Conduit
ELECTRO-GALVANIZED Conduit
BLACK ENAMELED Conduit

STEELDUCT HOT-DIP Galvanized Conduit is zinc-coated inside and out, including the threads (Licensed under patents pending).

All STEELDUCT Conduit is made from mild, easy-bending steel, with welds that will not open under the most severe bending.

The THREADS on every length of STEELDUCT Conduit are PROTECTED with metal and cardboard protectors that insure perfect threads when STEELDUCT Conduit is delivered on the job.

Use STEELDUCT on your next job and save on installation costs.

The STEELDUCT Company
YOUNGSTOWN · · OHIO

Code Chats . . . . .

Questions and answers relating to the interpretation of the National Electrical Code . . .

Conducted by F. N. M. Squires

Chief Inspector New York Board of Fire Underwriters

Circuits Without a Grounded Neutral

Under 2001-a requiring ground identification there are certain exceptions.

Why does the neutral have to be run in the premises as long as it is not going to be used? It seems a lot of wire would be wasted.

Why would these systems be apt to be used instead of grounded systems and circuits without identified wire?

While 2001-a first requires that each system and circuit contains an identified grounded wire it also makes exceptions which permit the use of ungrounded systems and circuits.

There are, in fact, many services installed for power alone in which the grounded neutral wire is not run into the premises as no lighting is taken from this service. This is permissible under the exceptions of 2001-a.

Use of a Service Switch

What is the main purpose of a service switch?

I always had an idea it was for making a building dead in case of fire, but this cannot be so as they allow the service switch to be omitted if branch circuits under 405-b are protected with circuit breakers with not over 6 circuits for a one-family house.—405-b, Paragraph 2.

In this case a fireman would have to trip off six breakers. Perhaps he would not know how to work them.

Originally the purpose of a service switch was so that it could be pulled in case of fire and that the firemen working on the building would then know that all the wires in the building were dead. However, it is now found that the firemen are about the last ones desiring to cut off the current from a building. They want the lights as long as possible to facilitate their work.

It is because of this trend of thought that there is no particular necessity for a single service switch and that the Code now permits, under certain conditions, the use of more than one service switch.

Shock from Neon Transformer

Does 3808-f imply that a shock from a neon sign might be fatal. Would it be apt to do more harm than one from 220 volts?

This depends somewhat on the characteristics of the person receiving the shock and to the manner in which he receives it.

Promotes Group Trips: Over one hundred electrical men from Lancaster County, Pa., recently traveled to Philadelphia by chartered buses to attend an exhibit of electrical materials. This trip was organized by Geo. W. Richardson, pioneer proprietor of the Lancaster Electrical Supply and Constuction Co., Lancaster, Pa. Mr. Richardson has been engaged in electrical work for forty-three years, and at Lancaster since 1902. One of his early day experienecs was that of working on the old Madison Square Garden in New York. There is much good to be accomplished by local associations in getting all of the contractors of the community interested in meetings and trips of an educational nature, in the opinion of this successful pioneer, and he therefore devotes a great deal of time in planning such activities.

The gas tube type of transformer could not be successfully used as a means of electrocution. This type of transformer has a limited output capacity, generally in the neighborhood of 150 mili-amp. or less. Such small current even at the high voltage of 15,000 is not generally dangerous to life, although not very comfortable to the feelings.

Men working on signs advise that they get quite used to currents up to 50 mili-amp., but do not want to encounter them above 75 mili-amp., although they do not consider them dangerous until they exceed about 150 mili-amp.

Garage Wiring in Bulk Oil Plants

In the course of laying-out and installing electrical wiring and equipment at bulk plants for various oil companies the question of where Article 32 applies, particularly with respect to the garage, always comes up for questioning.

At all of these bulk dispensing plants the principal building units consist of

(a) Large capacity gasoline and various oil storage tanks.

(b) Gasoline pump house to load trucks.

(c) Gasoline and oil loading racks for tank automobiles.

(d) Oil and grease warehouse.

(e) Combination garage and office building.

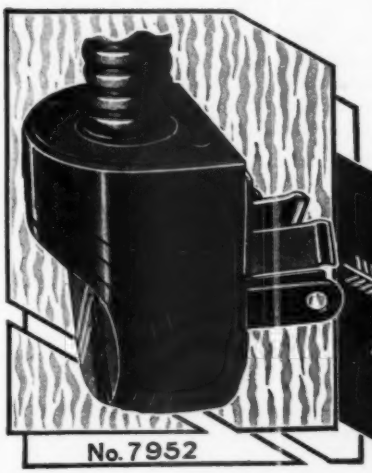
In all except the office portion of garage building we have been installing Class I equipment, but the expense of such type installation in the garage itself is always questioned, the contention being that Article 33, Section 3302, Paragraph B, applies rather than Article 32, which opinion, unfortunately, seems to be shared by the various enforcement bureaus, as well as the manufacturers that furnish unit heaters, car washers, air compressors, etc., that are installed at the same time as the wiring equipment.

I am of the opinion that in this garage area, on account of the type of automobiles stored, cleaned, washed and repaired therein, that this is a hazardous area and that all equipment and wiring therein should be of the Class I type, even though loaded trucks are kept out. Am I correct in my interpretation?

It would appear that in a plant such as outlined above units *a*, *b*, and *c* would unquestionably come under Class I locations. The *d* unit, which is the oil and grease warehouse, and used for the storage of oils and greases in sealed containers, would

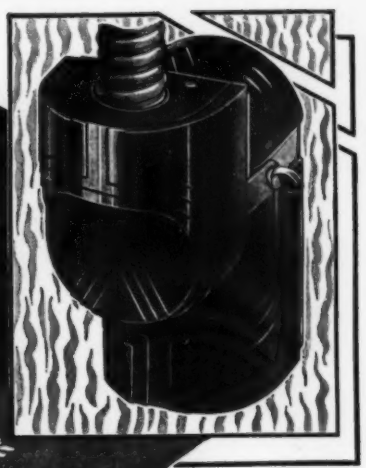
ARROW BAKELITE RANGE CAP

with Solderless Connections



No. 7952

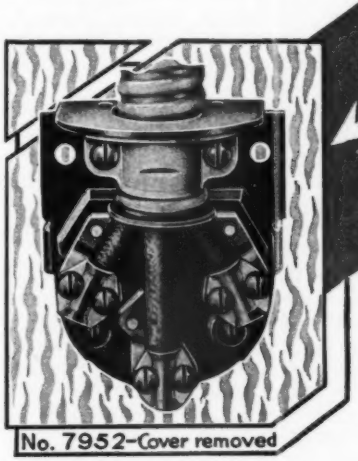
TO-GO-WITH BAKELITE RANGE OUTLET



Makes neat, compact installation

This new 90°-angle Range Cap is designed primarily as a companion piece to ARROW Range Outlets. Together they make a neat, compact installation, even to harmony of design. . . Ground straps on cap connect with ground clamp on receptacle, making easy and secure ground connections. The built-in cable clamp eliminates awkward right-angle cable connections.

STRAIGHT-IN-WIRING CABLE CLAMP BUILT-IN



No. 7952—Cover removed

easy, economical to install—

Straight-in wiring with *solderless connections* make this cap easy and economical to install. Adapted for use with 3-wire all-rubber cable as well as metallic or non-metallic sheathed cable. Can be used with flush receptacles *or other connections* of 50 Amperes, 250 Volts rating. . . Write us for points of further interest in cutting your cost of range installations with these fast-wiring caps and receptacles. Illustrated data-sheets on request.

ARROW ELECTRIC DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

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Roll Type No. 64

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Roll Type No. 40

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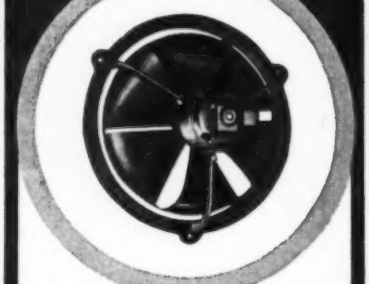

Ventilating Fans

If you are not installing Signal Vent Fans, investigate this popular line at once. The reason? Guaranteed quality at prices that return you a satisfactory profit. Here's a complete line that's easy to sell and stays sold. Bucket Blade and Flat Blade Fans, Automatic Shutters, Switches and kitchen fans, adjustable or built-in types. If your jobber cannot supply you write us.

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Menominee, Michigan, U. S. A.

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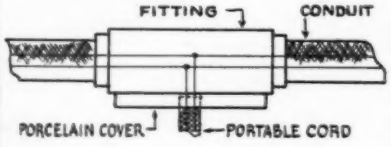
not be considered as a hazardous location.

The unit *e*, however, presents a little problem. Normally the garage part would come under Article 33 rather than under Article 32, but some consideration must be given to the fact that the trucks housed there are gasoline tank cars, and, even when empty, have considerable flammable vapors about them.

Explosion-proof work and materials are to be strongly recommended, but an inspection authority might give consideration to conditions in the individual building, such as ventilation, etc., and require merely compliance with the garage rules instead of requiring explosion-proof work.

Connection for Portable Cord in Hazardous Location

Rule 3203-n states that connections of portable cords direct to supply conductors are allowed for hazardous locations. Would the sketch below cover this?



The method of connection—that is, the solid connection of the cord to the circuit wiring, is all right, but the outlet box must be of the explosion-proof type to comply with Rule 3203-b.

Protecting Service Conductors From Moisture

Please interpret for us 402-c and 404-d—" . . . and shall be protected from moisture . . ., or by other means approved for the purpose . . ."

Are rubber-covered conductors in conduit approved without other covering, and, if so, where in the Code is this practice approved?

The other means specified, refer to the use of service entrance cable of the proper type, it being incumbent upon the user and the inspector to ascertain that the proper type of cable has been selected for the particular conditions encountered.

Of course, this requirement for lead covering, or other approved means, comes under service requirements. In 503-p we have a requirement for the use of lead covering over wires where conduit work is used underground. In the 1935 Code the word "moisture" will be eliminated from paragraph 503-p, which will then require the lead covering to be used in any work underground without the question of the moisture condition coming in.

For circuit work out-of-doors, where rubber-covered wire in conduit is used, the Code does not require the lead covering unless the conduit be in permanently moist locations where subject to the condensation of moisture, unless the conduit is underground.

Air Cooled Transformers

Is it permissible to install a 40-kva., 220/110-volt transformer in a building without placing it in a transformer vault?

Yes, the Code permits this.

Rule 1102-a requires a vault for oil-filled transformers except for transformers of 7½-kva. or less which are not in proximity to combustible material. Rule 1102-b governs the air-cooled transformer and contains no requirement for a vault for this type.

Protection for Small Motors

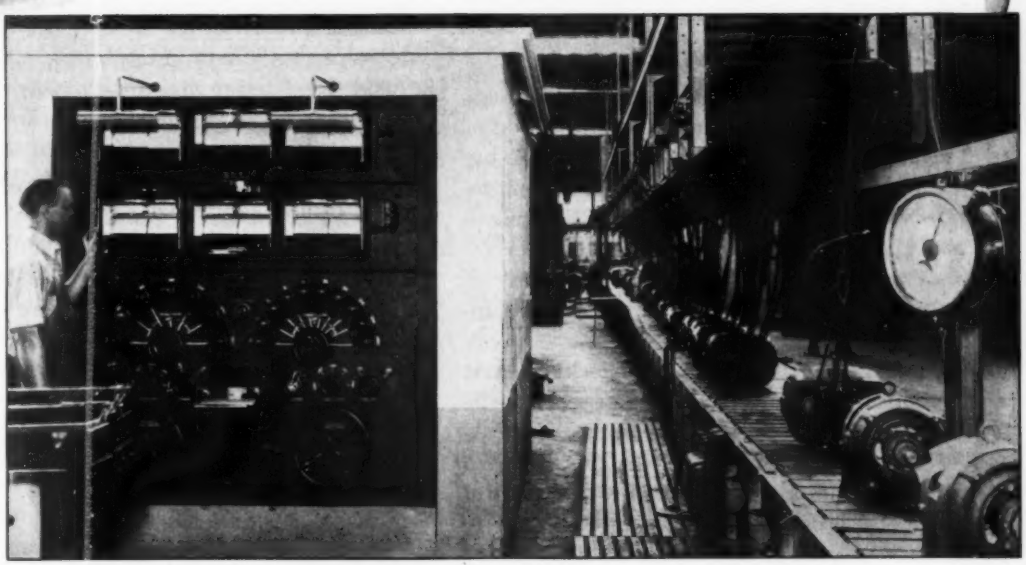
Section 808-c, Exception 1, as printed in the International Association of Electrical Inspectors News Bulletin of May, 1935, requires that all electric motors of ½ hp. and larger which are started automatically have running power protection which does not exceed 140 per cent of the full-load rating of the motor.

It would seem that the enforcement of such a rule would be very difficult. For example, a ½ hp. motor having a full-load running current of 2 amp. would, according to this ruling, require a 2.8-amp. fuse. It can be readily seen from these figures the impossibility of enforcing such a rule.

It is true that it would probably be difficult to use a 2.8-amp. ordinary type of fuse in the above case and the Rule 808-c, Exception 1 (of the 1935 Code as quoted by our correspondent), was written with this fully in mind.

Note that the rule states that the motors shall have running protection at 140 per cent of the motor rating. This would then preclude the use of the ordinary type fuse and require the use of a time lag protective device, such as a circuit breaker of the proper design or a time-lag fuse which would allow for the starting current during the starting period, but would afford running protection at 140 per cent after the short starting period.

Tradition of Craftsmanship



★ True craftsmanship in motor building doesn't stop at the end of the production line.

This scene, taken at the AC motor test block in the great Fairbanks-Morse motor shops, shows but a *part* of the rigid inspection which every motor bearing the F-M seal must undergo.

No Fairbanks-Morse motor may move past this block until it has been given a thorough test to insure that it is A-1 electrically and mechanically—and that it conforms to the high F-M standards.

The operator shown here at his work tests each motor for its voltage, current, kw., running torque, starting torque and other characteristics. These are recorded automatically on the six sealed instruments at the top of the block. No one can in any way affect or control these chart readings.

Upon completion of this stiff test, no motor can be permitted to leave the line until the inspectors in the engineering department have checked the chart calibrations and are satisfied with the motor's performance under the same operating conditions for which it is rated.

This tradition of craftsmanship, extending far beyond the wiring and metal, is every F-M motor owner's assurance of the long life, dependability and satisfaction he expects from his motor investment. It is your assurance that the Fairbanks-Morse motors you sell or recommend for installation will substantiate your good judgment.

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ELECTRICAL CONTRACTING

S. B. WILLIAMS, Editor

A Program

THE National Electrical Contractors Association is to be congratulated upon the action of its Executive Committee, taken at the meeting last month in Chicago, in setting up a definite program of work. The program is comprehensive and stimulating.

The new program has had the careful study of the Executive Committee, and deserves the support of the industry. It is predicated upon helping the contractors to regain lost business and build solidly for the future. The contractor little by little has been losing the support and cooperation of the other branches of the industry. In some respects this has been his own fault and in other respects others have been responsible. To regain his lost ground, the contractor must assert himself as a worthwhile sales agency.

It was interesting to note in the deliberations of this program how frequently emphasis was placed upon selling. It is a healthy sign that the leaders of the industry are recognizing that economic conditions are demanding a different type of selling today. The contractor has a new competitor today—the customer.

Voluntary Agreements

TO TAKE the place of the N.R.A. Code, there has come a demand for voluntary agreements. In the electrical contracting industry a number of plans have been developed, some of which are about ready to start.

It would be very desirable to have a practical plan whereby the contractors in any locality could set up a workable voluntary agreement that was legally sound and did not depend upon labor, unlawful boycott, or other outside agencies for enforcement. The National Association has voted to take this assignment and will try to find an answer.

In the meantime, those communities that do set up agreements should bear in mind that they no longer have the force of government at their back, and that they therefore cannot set up rules governing anyone except those who voluntarily sign the agreement. In other words, they cannot lawfully impose rules upon non-signers.

It will be contended by many that if you cannot impose a code upon everybody in the industry, and if you do not use labor as a weapon to enforce the code, it is useless. If that is the condition, might it not be better not to undertake an agreement than to enter into a plan that might bring legal action and unfavorable publicity?

It is to be hoped that the National Association in accepting this assignment will lose no time in making its study, because the information is needed now. Furthermore, it is to be hoped the Association, if it cannot find a workable and satisfactory plan, will not hesitate to say so and give its reasons. It might be that such advice would be contrary to the activities of some local group, but, after all, it must be remembered that the activities of any local group of electrical contractors that get into the law courts bring publicity that is unfavorable to the industry in several other localities. The Association can be of great help to the industry in this instance, even if it says, "No—codes cannot be enforced."

Publicity Results

AN ORDINANCE is only as good as it works. The mere fact that a law has been passed and an inspector named, does not guarantee that henceforth the wiring in that locality will be safe. Until the ordinance is sold to the public in a way that will make people realize that that law is in the public interest, and will be enforced, the maximum results will not be attained.

Less than two years ago Mt. Vernon, N. Y., a suburb of New York City, secured the passage of a licensing and inspection ordinance which has been and is still being sold to the public. The results have been very beneficial to the electrical contractors of that community. Bootlegging has been minimized, reinspection has provided work, and compliance secured from all elements of the public.

Because of the simplicity with which these results were accomplished a staff representative of ELECTRICAL CONTRACTING spent considerable time studying the actual operations and reports, and

the results appear elsewhere in this issue. This study was made in the hope that it might prove to other communities the advantages to be gained through systematic publicity of a news nature.

Much of our bootlegging troubles will vanish, as Mt. Vernon has proven, if the public is taught to respect the local code.

Strikeless Industry

THE electrical construction industry has the unique distinction of being known as the strikeless industry. This happy situation can be attributed to the Council for Industrial Relations, which is composed of an equal number of electrical contractors employing union labor and of representatives of I.B.E.W., and which arbitrates differences upon invitation, when the local people have been unable to come to a mutually acceptable agreement.

When the N.E.C.A. had a Closed Shop Section, it sponsored the Council. Upon the formation of the Electrical Guild of North America, the labor sections of the Association were discontinued, and the Guild assumed the sponsorship of the Council. When the Guild disbanded, the sponsorship went to the Conference Club, where it rests at the present time.

The Council is, in effect, a board of arbitration in labor disputes in the electrical construction industry. It does not enter a dispute until it has been invited to do so by both sides and then only when both sides have agreed that its decision will be final and binding.

It is interesting to note that the Council, when started, expected to have a great number of cases brought to it, but the facts are very much to the contrary. It is a rule of the Council that in presenting a case to it, both sides must fully outline the points in disagreement, their position and the reasons therefor. The simple matter of putting its side of the case down on paper and attempting to justify it has, in a majority of cases, caused one side or the other to see the weakness of its position and to end the dispute forthwith.

It would appear that labor disputes have far too frequently been the result of heated argument, and that when facts are placed on paper and coolly analyzed, the disagreements disappear. Before the Council on Industrial Relations was started the electrical construction industry wasted millions of dollars in strikes because no such analysis was made. Through the Council this waste has been stopped and we have enjoyed for years a strikeless industry.

Moreover, a strikeless electrical construction industry means not only continuity of employment for the worker, and job progress for the contractor, but it means an uninterrupted flow of goods for the electrical manufacturer and wholesaler, it means no delays in the completion of the work and the starting of another customer for the power company.

We know of no other industry where the manufacturers' business has been so protected. It is one more example of a definite contribution to the welfare of the electrical industry made by the construction branch.

Two Cities

In the middle west there is a metropolitan city wherein the electrical contractors do virtually all of the construction work for the industrials. In the east there is another city of about the same size wherein the electrical contractors once did this work for the industrials but now do almost none of it.

In the former city the contractors are organized and have a certain amount of respect for each other. In the latter, the contractors have been disorganized for some time and have mistrust and hatred for each other.

It may be that there is no connection between the two facts. Nevertheless, does it not seem strange that the situations should be as they are?

Utility Modernization

WHILE the program of modernization is in the limelight, we may well observe the opportunity for electrical men in the improvement of power company service facilities as a means of taking up the slack in the wiring field. Some communities have commenced such activities, and have found it advantageous to have the contractor handle this program. Much of this work involves detailed field contact with the public. Outdoor metering is a touchy subject with some customers. Where the contractor becomes the contact man for the power company, he not only will keep the good will of the customer, but will find occasional wiring jobs on the premises as well.

In the absence of large new construction projects, a modernization program of this kind among various power companies would have a far-reaching effect at this time.

UMI

N.E.C.A. News..

Material for this department is supplied by the headquarters staff of the

National Electrical Contractors Association

420 Lexington Avenue, New York, N. Y.

President	Vice President	General Manager
L. E. Mayer	E. N. Peak	Laurence W. Davis
569 West Van Buren St.	1603 West Main St.	420 Lexington Avenue
Chicago, Ill.	Marshalltown, Ia.	New York, N. Y.

14-Point Program

A broad 14-point program of immediate activity for the N.E.C.A. was adopted by the Executive Committee at a meeting held in Chicago on July 15, 16 and 17, which closely follows the convention program that appeared last month in these columns. The 14 points in this program are:

1. New Constitution and By-Laws: A detailed report will be found in another column.

2. Voluntary Agreements for Industry Self-Regulation: A special committee was authorized to study intensively voluntary code plans in their practical and legal aspects in order to assist communities to develop sound codes.

3. Licensing Legislation: It was recommended that a national committee of representatives of N.E.C.A. and all other industry interests be created for the purpose of preparing a mutually acceptable state licensing bill. A recommendation that a state licensing law be advocated was adopted.

4. Business and Market Development Programs: While recommending cooperation with the manufacturers and utilities in the Better Light—Better Sight campangn and other market development programs the committee favored action by N.E.C.A. to help the contractors regain the industrial market offering as a solution the necessity for contractors to establish more efficient sales organizations and to devote more time to creative selling.

5. Selling Industrials: It was recognized that distribution policies which have resulted in increasing disturbance of the industrial market through direct selling by manufacturers and wholesalers to the consumer requires mutual consideration by all interests involved, and to this end it was recommended that a thorough study of the points at issue be made, and that all interests be brought into this study.

6. Range Wiring: The committee recognized that adequate and economical wiring methods are essential for the greatest development of this market and that to do this the contractor must have sufficient volume of range wiring to secure the economies of production methods through quantity purchasing and the elimination of lost labor. The committee approved the use of economical forms of wiring with due regard for safety and recognition of the increasing size of ranges. Because of varying local requirements of ordinances and for metering, the committee did not favor national range wiring standards, but did recommend that contractors work with their utilities in setting up local standards.

7. Merchandising and Time Payments: The committee recommended the study of several merchandising and time payment plans to the end that a plan be formulated for selling appliances to the public. The plan should oppose sale of sub-standard merchandise. It should provide for time payment, reasonable overhead, selling and servicing costs and a profit, prequalification of selling agencies and their membership in the N.E.C.A. and the local electrical league, ample advertising promoting the stores with the league emblem of qualification.

8. National Electrical Code Policy: The following policy was adopted:

"The National Electrical Contractors Association declares its policy to be the extension of electrical service to the greatest number of users and to this end the Association believes that every effort should be made to reduce the cost of electrical installations through developments in wiring methods and installation practices consistent with the safety and convenience of the public, which must be safeguarded at all times."

9. Wiring Adequacy Standards: The Manual of Adequate Wiring prepared for the North Carolina Chapter, I.A.E.I., by Arthur L. Abbott of the Uniform Legislation Department of the N.E.M.A., was endorsed and a recommendation made that it be further extended and made available as an industry standard and to this end the N.E.C.A. offers its cooperation.

10. Manufacturers and Jobbers Distribution Policies: Because of the similarity with No. 5 it was felt advisable to cover both programs in a similar fashion.

11. Motor Discounts: It was recommended that the motor manufacturers establish a new discount schedule as follows:

Motor agents to qualify must sell not less than $5,000 worth of motors and equipment annually. Discounts for motor agents other than machinery manufacturers should be:

On motors up to 100 hp.....	25%
From 100 hp. to 200 hp.....	20%
From 201 hp. to 300 hp.....	15%
From 301 hp. and up.....	10%

Industrial plants—

Less than $5,000 at one time.	Net
$5,000 and over	
Up to 100 hp.....	10%
200 hp. to 300 hp.....	7%
Over 300 hp.....	Net

Machinery manufacturers—

$5,000 a year and over	
Up to 100 hp.....	20%
200 hp. to 300 hp.....	15%
Over 300 hp.....	10%

Contractors having no motor agreement—

Up to 200 hp.....	10%
Over 200 hp.....	5%

N.E.C.A. Convention, Sept. 23-25

Plans are now being perfected for the N.E.C.A. convention to be held in Chicago, September 23 to 25, at the Hotel LaSalle. The details for entertainment are being worked out with the Chicago Chapter, N.E.C.A., and the Electric Association of Chicago acting as hosts. The program will be unusually complete and practical with sufficient time allowed for discussion.

The hotel has set apart spacious club quarters on the floor just below the meeting hall to provide for the relaxation between meetings of those attending the convention.

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Since the beginning the Underwriters have required the protection of conductors where passing through metal. For all round use in power or light circuits, porcelain bushings afford the most practical insulation for such use. For 20 years Multi Porcelain Bushings have been handled by the leading jobbers throughout the country.

When a special condition arises either in wiring installations or in production equipment you can count on Multi Bushings having one in its large line to meet the particular requirement. Ask for Multi Bushings or write us direct for catalogue sheets or samples.

MULTI ELECTRICAL MFG. CO.
1840 W. 14th St., CHICAGO, ILL.

12. Relations With Other Sub-Contractor Groups: The resolution prepared by the joint committee from the plumbing, heating and electrical contracting national associations was approved and the committee authorized to go ahead with the preparation of a plan for securing the introduction of suitable bills into Congress in 1936 looking towards the protection of sub-contractors' interests.

13. Federal Legislation:

(*a*) Wagner Act—The committee was of the opinion that it is too early to determine to what extent this act may affect the electrical contracting industry.

(*b*) Social Security Bill—The committee went on record as favoring all forward looking social legislation having in view the paramount position of the individual states.

(*c*) Work Relief Bill—The committee favored the employment of established engineering and contracting companies on all Work Relief Programs as better qualified to do the work, to conserve funds, so as to spread labor to provide employment to the greatest number, and to prevent the destruction of business organizations.

(*d*) Rural Electrification Administration—The committee prepared a communication to the administrator pointing out that the electrical contractors have had wide experience in the erection of power lines, employ highly skilled electrical workers and are in a position to handle electric power lines at the lowest effective cost.

14. Organized Labor Relations: It was recommended that the N.E.C.A. approach the Conference Club with a view toward taking over the sponsorship of the Council on Industrial Relations for the Electrical Construction Industry which formerly was under the N.E.C.A.

Carrying on Pioneer Business: A large industrial contracting and supply business that was founded by his father in 1905 at Harrisburg, Pa., as the Dauphin Electrical Supplies Co., has been successfully carried on for eight years by A. J. Musser. An interesting contract just begun involves wiring a local bank remodeling job, a structure that was built in 1814.

New Constitution and By-Laws Approved

A new constitution and by-laws for the N.E.C.A. was adopted by the Executive Committee at the meeting in Chicago last month, more clearly defining the objects and policies of the Association, redistricting the country for Executive Committee representation, and establishing new requirements for the election of officers and executive committeemen. This new form will be submitted by mail to all members for their consideration and will be presented to the convention to be held in Chicago in September for ratification.

The greatest change will be found in the redistricting of the country. Formerly there were nine districts, two of which were in Canada. Under the new plan there will still be nine districts, but they will wholly be confined to the United States. These are as follows:

Division 1. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

Division 2. New York.

Division 3. Pennsylvania, New Jersey, Delaware, Maryland, District of Columbia.

Division 4. Ohio, West Virginia, Kentucky.

Division 5. Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi.

Division 6. Illinois, Indiana, Michigan, Missouri.

Division 7. Minnesota, North Dakota, South Dakota, Montana, Iowa, Wisconsin, Nebraska, Wyoming.

Division 8. Arkansas, Louisiana, Oklahoma, Texas, New Mexico, Kansas, Colorado.

Division 9. Washington, Oregon, Idaho, California, Nevada, Utah, Arizona.

The Executive Committee will be composed of nine district representatives, each to be elected by his own district and the president and junior past president ex-officio. To be eligible for election as a district representative a member must be at least thirty years of age, and a member in good standing for at least five consecutive years next prior to his election. The same eligibility rules hold for president, except that the minimum age is thirty-five years, and also with the condition that he shall have been a member of the Executive Committee. Executive committeemen will serve for a term of three years with three members retiring each year. The president's term of office will be for two years. Under this plan no provision is made for executive committeemen at large, as has been the practice in the past. The office of vice-president is abolished.

Active membership will be confined to electrical contractors and electrical dealers doing business in North America. Contractors and dealers doing business elsewhere may apply for associate membership.

Standing committees remain the same with one new committee to be known as the Labor Relations Committee.

Contracting .... News .....

Modified Code for San Francisco Construction Group

Lloyd Flatland, Globe Electric Works, former president, was elected unanimously to the presidency of the San Francisco Electrical Contractors Association, Inc., at its special election, June 27, 1935. He succeeds Joe Carlson, Central Electric Company, who was president for the preceding six months. Bert Doherty was elected to the board of directors and Ed Dowd, of Dowd-Seid Electric Company, was elected treasurer and therefore a member of the board.

An outline of a code for the construction industry in San Francisco County, being worked out jointly by labor and various groups in the construction business and representatives of capital and the public, was read at the meeting. The proposed program was endorsed in principle and is to be resubmitted in final form at a future meeting. Under the plan wages, hours and working conditions would be maintained at the code status and simplified fair trade practice provisions to prevent bid shopping instituted in the industry. The use of the central bid depository would be enlarged and its functions expanded to make it of greater benefit to the industry. Former President Charles A. Langlais is working on a committee with the Construction Industry Conference in the preparation of this program, it was announced.

90 Per Cent PWA Labor to Come From Relief Rolls

Regulations governing PWA's participation in the Work Relief Program have just been issued. Wage rates are to be fixed not by zones, but by local conditions.

Workers will be obtained through the United States Employment Service. Preference in employment shall be given to persons from the public relief rolls, and, except with the specific authorization of the PWA, at least 90 per cent of the persons employed on any project shall be taken from the relief rolls. The contractor, however, may continue to bring supervisory and administrative employees and key men on the job, as at present, provided their number does not exceed 10 per cent of the total number employed.

The contractor may dismiss any employee not qualified to perform the work for which he has been referred.

The rules prescribe that except in emergencies the maximum hours of manual work on PWA projects shall be eight hours per day and 130 hours per month. In some cases a 40-hour week will be permitted.

Rural Electrification Plans and Terms

The Rural Electrification Administration in its first general announcement of plans and terms for rural electrification loans, states that it will make no grants, but under suitable conditions it will lend the entire cost of building power and light lines in areas now without electric service. Loans will be for twenty years, normally, at the low interest rate of 3 per cent. No farmer will be required to mortgage his home.

Loans to private companies will usually be secured through the general credit of the borrower. In certain instances and especially on loans to non-profit agencies the line itself will provide the security.

The erection of lines will be directed by contractors, utility companies, states and subdivisions of the states, farmers and in certain instances by the Federal Government itself.

REA does not have and does not plan to have any state or regional organizations. All correspondence relating to inquiries and projects will be with the headquarters in Washington. All authorizations for project loans will come from Washington.

Out of the projects nearing completion and those to follow REA looks forward confidently to a new, different, and far more complete electrification of rural districts. Mass construction, planned and executed for large areas instead of piecemeal, will be employed for the first time. Costs will be reduced.

Planned electrical development will embrace not merely the erection of poles and wires, but the wiring of farm homes, the installation of electrical appliances, and the introduction of modern bathrooms and modern kitchen sinks. The plumbing equipment will be made possible, for the first time on many farms, by electrically operated water systems. Government financing is contemplated for the electrical appliances and sanitary equipment, through loans at lower interest rates and on easier terms than in the past.

Enters Air Conditioning Field: Having operated a large contracting organization at Reading, Pa., with branch offices at Harrisburg and York, also a motor service shop at Lebanon, Pa., Yale Evelev, president of the Keystone Engineering Corporation recenlty formed an additional company to engage in large air conditioning projects. The Keystone Tiltz Air Conditioning Corporation of Reading also maintains offices in New York, N. Y., where Bernard E. Tiltz, treasurer of the latter organization, will maintain contact with, and engineer this new phase of business. The complete supervision of all sub-contracts is contemplated because of Mr. Tiltz's extensive experience in this new field.

Bill to Protect Subs on Federal Work

A bill has been introduced in the House (H.R. 8519) requiring the furnishing by the general contractor on all government work of a performance bond and a payment bond for the protection of sub-contractors and material men. The bill provides that a subcontractor who has not been paid after ninety days from completion of the work may make a claim and sue on that payment bond in the name of the United States.

Southern California Contractors Set Up Code

A voluntary code of fair competition has been placed in operation by the Southern California Chapter, N.E.C.A., to govern the operations of the members who subscribe thereto.

The code includes virtually the same wage and labor clauses as the N.R.A. Code, except that the helper ratio is one to one. The rules of fair competition likewise closely parallel the N.R.A.

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Hotel La Salle

CONVENTION HEADQUARTERS

National Electrical Contractors Assn.

SEPTEMBER 23-24-25, 1935

HOTEL LA SALLE—CHICAGO

CUT OUT COUPON BELOW IF ATTENDING AND MAIL TO HOTEL LA SALLE, CHICAGO

ROOM RESERVATION CARD

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION

September 23-24-25, 1935—Hotel La Salle, Chicago

Gentlemen:

Please make reservation for my arrival as indicated below:

Single room with bath, inside, $2.50.....
Single room with bath, outside, $3.00.....
Room with double bed and bath, $5.00.....
Room with twin beds and bath, $5.00 $6.00 $7.00.....
Two connecting rooms with bath for two, $4.50.....
Two connecting rooms with bath for three, $6.00.....
Two connecting rooms with bath for four, $7.00.....

Expect to arrive (date).....at about.....m.

Name.....

Address.....

Conducts Extensive Organization: The outgrowth of an original electrical contracting business that was founded by W. E. Haeseler at Reading, Pa., is known as the Berks Engineering Co. Large machine shops, sheet metal works, pattern making departments, and a complete coil-making division are operated in addition to the original contracting and motor repair departments.

Code, with bid filing on jobs of $100 or more.

For the purpose of administration, the members are classified into four groups, according to size. The administration committee of five will include one representative from each group, and one member at large.

Liquidating damages are provided in the order of 5 per cent of the transaction involved or $15.00 where damages cannot be computed on a percentage basis. All matters of controversy are to be submitted to a named arbitrator.

Minnesota Contractors Discuss Markets

The eighth annual summer meeting of the Minnesota Electrical Association was held in Duluth, Minn., July 19 and 20, in connection with the annual summer outing of the Duluth Electrical League.

An all electrical industry sales conference took place on Friday evening, with Dr. G. W. Allison of the Edison Electric Institute, New York, as the main speaker. C. M. Baldwin of the Minnesota Power & Light Company, and T. L. Losby of the Northern States Power Company, discussed the utilities' promotional sales campaigns.

John Ellenbecker of the Granite City Electric Company, St. Cloud, as president of the Minnesota Electrical Association, touched briefly upon the history of the association to provide a strong central organization in promoting and helping to make cooperative campaigns more effective.

On Saturday the rural electrification program was the major topic.

J. W. Hruska of the Mankato Electric Company was elected president, Sam Newstone, Montevideo, vice president, F. M. Tripp, Minneapolis, treasurer, and William A. Ritt, St. Peter, re-elected secretary.

A Roll o' Tape

Electrical Flashes gathered among the big wire and pipe men

by

Electrical Contracting's Field Editors

A MODEL electric kitchen display has replaced appliance cases along the walls of the H. H. Roth store in Wilkes Barre, Pa. Complete kitchens mean major sales and good wiring additions.

ALTHOUGH business is scarce in Port Jervis, N. Y., L. S. Van Inwegen of that city keeps abreast of the times with modern tools. New items just at hand included an armored cable stripping tool, two solderless connector kits, and a recently developed radio tube testing panel.

THE manufacturing of special armature coils for trolley car motors involves a large variety of special clamping forms, some of which have cost the Berks Engineering Co., Reading, Pa., from $150 to $200 each.

WHEN the local power company completed the details and specifications for customer meter and transformer housings, the Berks Engineering Co., Reading, Pa., received the order. Thus on all large service equipment for new jobs may be seen Berks' labeled meter and transformer cabinets, although the wiring may have been installed by others.

SALESMANSHIP in emergency lighting systems may be justly accredited to H. N. Sell of the H. N. Crowder Jr., Co. of Allentown, Pa. An installation for the Lehigh County Poorhouse consists of an automatically controlled gasoline engine generator, instead of the conventional battery system. Astronomical clock devices were furnished to start the generator

performance

"WITH BELLS ON"

Westinghouse Signaling Transformers

Circuits with bells, gongs, sirens or other signaling equipment on the line do what's expected of them when the power supply comes through Westinghouse Signaling Transformers. Ratings range from 50 to 1000 watts; tap voltages from 24 down to 4, in steps of 4 volts. You can always get what you want for any type of job. Listed by Underwriters' Laboratories. Get complete information from your nearby Westinghouse jobber—or write us direct. Westinghouse Electric & Mfg. Co., Room 2-N, East Pittsburgh, Pa. R 52081

Westinghouse

No. 574-VB—Bare Armored Ground Wire Connector

No. 365—Armored Cable Bare Wire Solderless Ground Fitting

No. 255 and No. 256—Service Entrance Cable Heads

Build up prestige and good will by installing quality materials in all your jobs.

STEEL CITY PRODUCTS

help the electrical contractor gain a reputation, not only for furnishing quality products but workmanship as well, because they are manufactured in accordance with the workman's needs, insuring speedy, dependable performance at all times.

We manufacture a complete line of outlet boxes, covers, switch boxes, conduit fittings and electrical specialties, furnished in sherardized, galvanized, enameled or cadmium finish.

WRITE FOR OUR NEW CATALOGUE

STEEL CITY ELECTRIC CO.,
PITTSBURGH, PENNA.

Gentlemen:

Please send a copy of your new catalogue to

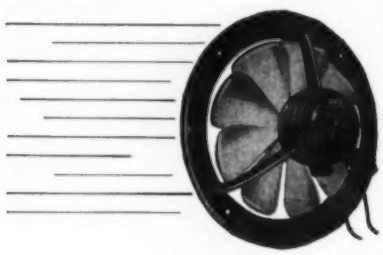
Name .....

Address .....

.....

BREEZO PROFITS

can be just as big as you want to make them



Made in Six Sizes

There is practically no limit to the Breezo market if you will go aggressively after it.

Homes, institutions, billiard rooms, garages, offices, restaurants —wherever better ventilation contributes to comfort, efficiency or safety—a LIVE prospect is waiting to be sold—and there's a Breezo Fan which will exactly meet requirements.

The Breezo Line is complete. It includes every type of ventilating unit for every class of installation —units which are efficient, quiet, trouble-free. They are easily demonstrated, quickly and easily installed.

Your profits in ventilation will be in direct proportion to your efforts in pushing Breezo Fans. Write for advertising material and prices.

BUFFALO FORGE COMPANY

491 Broadway, Buffalo, N. Y.

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

each evening for a short period of operation, as an automatic daily engine test. A second astronomical clock controls the principal a.c. supply. While a much lower standard would have satisfied the state requirements, Mr. Sell considered the best type system of the full automatic testing type most suitable for an isolated plant.

A RECORD of having repaired 13,000 motors since 1922 without the misplacement of any parts may justly be cited to the credit of J. C. Neuhauser, Lancaster, Pa.

CLOSE cooperation in sharing a large institutional wiring job at Wilkes-Barre, Pa. with another local firm resulted in the original estimate of Frank E. Baldwin being one-half of one per cent above the final job cost.

THE choice of a location in Great Neck, Long Island, N. Y., many years ago by Louis J. Gregory has proven exceptionally strategic. Today this location is beside the town's best new shops and its leading home sales and leasing agencies. This keeps Gregory's store in the eyes of the home-seeking public. Rents did not advance during boom days, since he owns his building.

POWER factor correction projects have caused the General Electrical Service Co., Harrisburg, Pa., to send the boys out with loaded trucks of equipment. Almost like the good old days.

JOB photographs are valuable for future reference in working out difficult problems, in the opinion of F. L. Odell of the A. J. Sordoni Const. Co., Forty Forts, Pa. One of this company's electricians specializes in photographing all difficult jobs. Extra prints of such photos are filed by classes or types of work so as to be available for reference when a similar problem arises later on. Often the photograph is more clear than if detailed sketches had been prepared.

A SPAN of forty years in business finds Wm. H. Aldrich of Patchogue, N. Y., actively engaged in community affairs in a manner which pays tribute to his trustworthiness. As a keeper of funds this Long Island electrical contractor has somewhat of a record. Mr. Aldrich is financial secretary of the Nassau-Suffolk County Electric League, treasurer of the Patchogue Chamber of Commerce, of that city's Federation of Business Clubs, and the Round Table Club. Just to fill in during spare time, he is also chairman of the Board of Electrical Control.

For

Residence Wiring

The Best and Safest Method is a properly installed KNOB and TUBE job. Be sure and get the

TRADE MARK Bull Dog REGISTERED

Assembled Knob because it "HAS A GRIP LIKE ITS NAMESAKE."

ILLINOIS ELECTRIC PORCELAIN CO.

MACOMB, ILLINOIS

MINERALLAC

Cable or Conduit Hanger

Jiffy Clip

Now furnished in EVERDUR as well as Cadmium Plated Steel.

Cable or Conduit Hanger
Rigid Conduit—⅜"—2½"
Thin Wall—½"—1½"

Jiffy Clip—Rigid Conduit
⅛"—1¼". Also B X Cable

Ask your Jobber

MINERALLAC ELECTRIC CO.

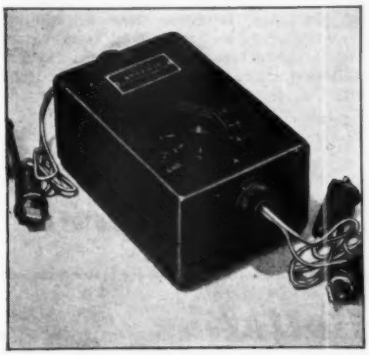
25 No. Peoria Street, Chicago, Ill.

New York City Branch
381 Fourth Avenue

New Products . for August . . .

Interference Analyzer

A compact instrument for use by radio servicemen, electrical mechanics and others, which is claimed to make possible the prompt location and elimination of all types of radio interference. It is also recommended as an



easy and inexpensive means of demonstrating to radio set owners just where and how annoying interference exists. This instrument is said to provide means of determining what condensers or chokes are necessary for noise elimination at motors, appliances, flashers, etc., after being connected into a circuit that is suspected of causing interference. Sprague Products Co., North Adams, Mass.

Porcelain Socket

An angle porcelain socket, No. 1126-B facilitates wiring in coves or other places of

limited dimensions, where standard lamps must be installed. A shade holder groove is provided for attaching reflectors. The Wiremold Co., Hartford, Conn.

Sealed Switch

A vacuum power switch that is sealed in a cylindrical high vacuum chamber, and which incorporates a solenoid to control the position of the contact mechanism, is claimed to eliminate the use of tilting or rotating devices in making or breaking contact. Rated at 20 amps., 110 v., and 10 amps., 220 v., a.c. or d.c., its maximum speed of operation at

full load is 100 contacts per minute. Because of a hermetically sealed contact chamber, this device is offered for use in corrosive or flammable atmospheres for sign flashing, automatic equipment control, signals, etc. It is available in single pole, single contact, normally open type VPS-1 and normally closed type VPS-2. Several units may be used to provide various contact arrangements. Pitting or burning of contacts is claimed to be eliminated, and there are no parts to wear out under continued action. Continental Electric Co., St. Charles, Ill.

Type A Switch

A line of type "A" industrial safety switches with "Quadbreak" switching for the 575-volt type, and "Dualbreak" switching for the 250-volt type. This design is claimed to provide long wear and depend-

able operation. Unit switch blocks are individually removable without disturbing the rest of the switch. The "Quadbreak" switches permit the connection of line and load at either top and bottom. Close banking of switches is possible, due to close-hugging switch handles, and front-hinged box cores. Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.

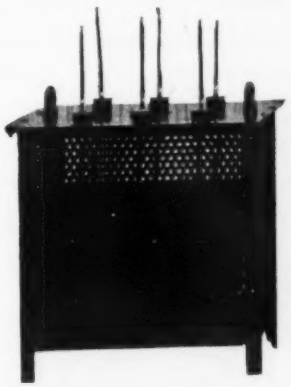
Lumiline Lamp Base

Lampholder bases, No. 1127-A are designed to fit Wiremold lighting strip No. 1100-B, and No. 1100-C, for installing

lumiline coves, built-in, luminous box, or show case lighting. These bases may be wired at the desired spacings, laid into No. 1100-B channel, and then locked into position by turning two screw-type lugs. The snap-on Cap No. 1100-C is then cut in lengths and snapped into position to fill all spaces between lamp bases. No. 1127-A bases are duplex type, accommodating two lamp clips back-to-back, or they may also be used as a single lampholder base. The Wiremold Co., Hartford, Conn.

Indoor Transformer

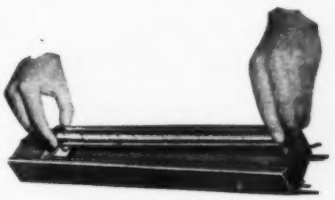
The "DA" line of air-cooled transformers for indoor use in any room without requiring a vault. They are built in



sizes up to 100 k.v.a., for operation without oil. This line was developed for factory use. R. E. Uptegraff Mfg. Co., Pittsburgh, Pa.

Lumiline Strip

A line of bright aluminum reflectors and snap-in fittings for 18-in. and 12-in. length lumiline lamps, known as "Lumiline Lightstrip" has been designed to fit into standard



Curtis strip wiring raceway. Lamp units may, therefore, be placed in continuous lines or in any desired spacings, by placing blank raceway covers between the reflector units. Standard raceways and fittings may be employed to install the channel around room perimeters in coves or for panel lighting effects for which lumiline lamps are to be used. Curtis Lighting, Inc., Chicago, Ill.

Gas Station Floodlight

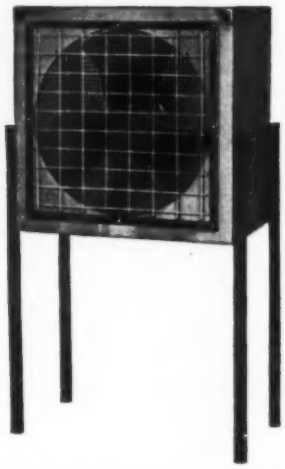
Type AL-46 open-type floodlights, designed to accommodate 300 to 1500-watt general service lamps. A two-position socket arrangement for 7-in. and 9½-in. light-center lamps gives this range in rating. Sheet steel, porcelain enamel reflecting surfaces and cast aluminum fittings are employed in the open-type unit, while an auxiliary parabolic aluminum reflector

UMI

is available for beam concentration. Five types of mountings can be had: Swivel and rocker, pipe-clamps, pipe-top, cross-arm, and slip-fitter. General Electric Co., Schenectady, N. Y.

Air Circulator

Type HV-1B air circulating assemblies include a sturdy cabinet with legs, which houses a propeller fan that delivers from 2,200 to 2,900 C.F.M. at a power input of from 210 to 260 watts. This unit may be



placed in front of an open attic window, or made permanent with duct connections. It may be used for forced attic air circulation, during the day, or for drawing cool outside air through the living quarters during the evenings. Efficient and quiet operation is claimed, due to a resilient motor mounting base. General Electric Co., Schenectady, N. Y.

Adjustable Fixture

A porcelain enameled steel reflector "Variety-Lite" for 100- or 200-watt lamps which employs an adjustable bracket that

may be locked in any desired position by means of three wing nuts. The bracket can be attached to the wall, ceiling or beams, or hung over the heads of screws or nails. A cord and attachment plug is included. Benjamin Electric Mfg. Co., Des Plaines, Ill.

Sign Transformer

A high intensity type transformer for luminous tube signs is claimed to have a milli-amp. rating double that of standard duty types without sacrificing or reducing the effectiveness of any other feature. This design is especially adapted to outdoor bill-

board or spectacular installation where maximum brilliancy to letters or design is important to the visibility range of the display. The Acme Electric & Manufacturing Co., Cleveland, O.

Single Pole Switch

A single pole switch, No. 5728-B has been designed for use in places where a fit-

ting of narrow dimension is required. It is rated 10 amps. 125 v., and 5 amps., 250 v. The Wiremold Co., Hartford, Conn.

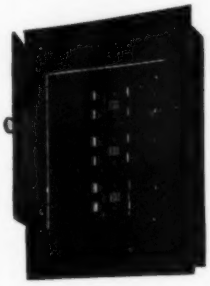
Neon Indicator Pilot

A line of "Indicator Tattelites" to operate on 90-250 volts, a.c., or d.c., which tell when a motor, heater, clock, radio, etc., is operating. Conversely, they can be made to indicate open circuits or switches, blown

fuses, etc. A neon bulb 1 in. long and ¼ in. in diameter, consuming about 1/1000 amp., and with a claimed life of 3,000 hours, is used. It is made with octagon-shaped bases, or dead-front panel type mountings. A limiting resistor which is used on these lamps is built into the panel mounting type. This design meets small space requiremnts. Littelfuse Laboratories, Chicago, Ill.

Switched Fuse Cabinets . . . .

Simplified design permits "Switch Centers" to be offered as a substitute for former fuse-only cabinets. NID type 30-amp., toggle switches and plug fuses are provided



for 4, 8 and 12-circuit assemblies. Switches are removable from the panel without removing the cabinet front, and quick-wiring circuit connectors are claimed to save installation time. Bull Dog Electric Products Co., Detroit, Mich.

Manufacturers'

Bulletins . . .

Motor Brushes: A revised edition of "The Brush Phase of Motor Maintenance" contains up to date illustrations of factory testing methods, in connection with additions and changes in the text matter of this booklet. The Ohio Carbon Co., Lakewood, O.

Electric Cells: "The Electric Eye in Theory and Practice," a 32-page booklet, containing diagrams and hints on present and future adoptions of the "electric eye" in a wide variety of work. Hugh H. Eby, Inc., Philadelphia, Pa.

Air Conditioners: Bulletins 109 and 110 describe Zephyr 60 and Zephyr 61, all-year air conditioners for residences and offices. Savage Arms Corporation, Air Conditioning Division, New York, N. Y.

Portable Electric Tools: A "Silver Anniversary" 50-page catalog covering electric drills, bench drill stands, drill accessories, screw drivers, nut runners, tappers, saws, hammers, grinders, sanders, polishers, glue pots, heat guns and various accessories. The Black & Decker Mfg. Co., Towson, Md.

Wire and Cable: Anaconda Publication No. 351, in 68 pages, with loose-leaf binding, lists, describes and illustrates all standard wire and cable for building and industrial use and also includes technical data. A thumb

index system permits quick reference to the desired subject or section. Anaconda Wire and Cable Co., New York, N. Y.

Electric Clock Systems: An illustrated brochure describes a line of electric clock systems required for schools, hospitals, banks and public buildings. Holtzer-Cabot Electric Co., Boston, Mass.

Safety Switches: Bulletin No. 1184, 8 pages devoted to type "A" heavy duty switches in compact front-operated and weather-proof types. The Electric Controller & Mfg. Co., Cleveland, O.

Insulation Testing Sets: Bulletin No. 400 covers five types of megohmmeters and megohmers, each in several capacities with detailed descriptions of each type. Herman H. Sticht & Co., New York, N. Y.

Solderless Connectors: Bulletin No. 22 illustrates and lists solderless connectors for No. 10 to 0000 service conductors and the "Wedge-Grip" line for small wires from two No. 14s to two No. 6s. H. B. Sherman Mfg. Co., Battle Creek, Mich.

Indirect Lighting: Handbook "H," serial 808, contains 26 pages devoted to the Curtis "Eye Comfort" line of luminaires, pedestals, wall urns, recessed lighting units, built-in lighting and other equipment. Curtis Lighting, Chicago, Ill.

Motors: Bulletin No. 601, "Motors for Centrifugals" deals with the special characteristics and details of construction of motors for centrifugal extractor drives and other special applications. The Louis Allis Co., Milwaukee, Wis.

Aluminum and Its Alloys: A 92-page book gives the fundamental information concerning Alcoa aluminum and the alloys which are available, including thirty-nine tables covering physical properties, corrosion resistance, annealing and other heat-treating practices. Aluminum Company of America, Pittsburgh, Pa.

Commercial - Residential Lighting: Duplexalite catalog No. D.P. 184, in a loose-leaf binder, contains 64 pages of illustrations and general information about lighting units and fittings for commercial and industrial requirements. Numerous installations are illustrated. Duplexalite Division of The Miller Co., Meriden, Conn.

Electrical Thermometer Regulation: Bulletin No. 4001, a 24-page illustrated booklet, "Efficient Regulation of an Air - Conditioning System" for the owner, architect, engineer and contractor. What each needs to know about electrical thermometers and their correct application is covered in a concise, orderly way. Leeds & Northrup Co., Philadelphia, Pa.

Insulating Materials: A 32-page indexed price book No. 49 includes about 125 items including adhesives, asbestos materials, battery seals, mica materials, paints, papers, tapes, twines, varnished tubing, varnishes, varnished fabrics and tapes, and other insulating materials used in motor repair shops. Mitchell-Rand Insulation Co., New York, N. Y.

Safety Starting Switches: Catalog No. 6 lists a choice of enclosed switches in type "A," "C," "D," "CR"; service entrance switches; small motor starting switches type "NF"; front operated manual motor starters with fuses, or with thermal overload protection; secondary circuit breakers in surface, flush and explosion-proof housings; a.c. and d.c. magnetic starters and contactors for motors, lighting loads, automatic transfer switches, and reversing starters, these devices being listed in standard housings, also weather-proof and explosion-proof enclosures. Additional listings cover pedestals, thermal cutout blocks, push button stations, thermal relay heaters, and other parts. A page of condensed starter control diagrams supplements detailed dimension sheets. Arrow Electric Division, The Arrow-Hart & Hegeman Electric Co., Hartford, Conn.

Trade Notes . .

Wolverine Tube Co., Detroit, Mich., announces the following appointments: Rick & Selleg, Chicago, Ill., to cover Chicago and Milwaukeee, Wis., and H. M. Linter of New York, N. Y., to cover the New York metropolitan area.

The Wadsworth Electric Mfg. Co., Inc., Covington, Ky., announces the appointment of the S. G. Cummings Co., 209 North Third Street, Philadelphia, Pa., as its representatives in that city and surrounding cities of New Jersey.

American Automatic Electric Sales Co., Chicago, Ill., has engaged Al W. Ferris as its New York City representative for Serv-U-Fones, with headquarters at 21 East 40th Street, New York. N. Y.

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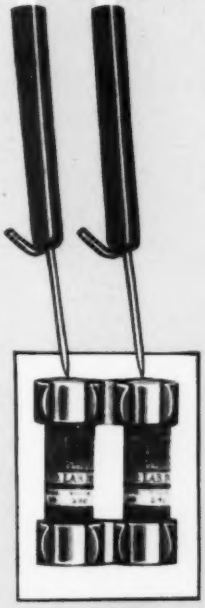

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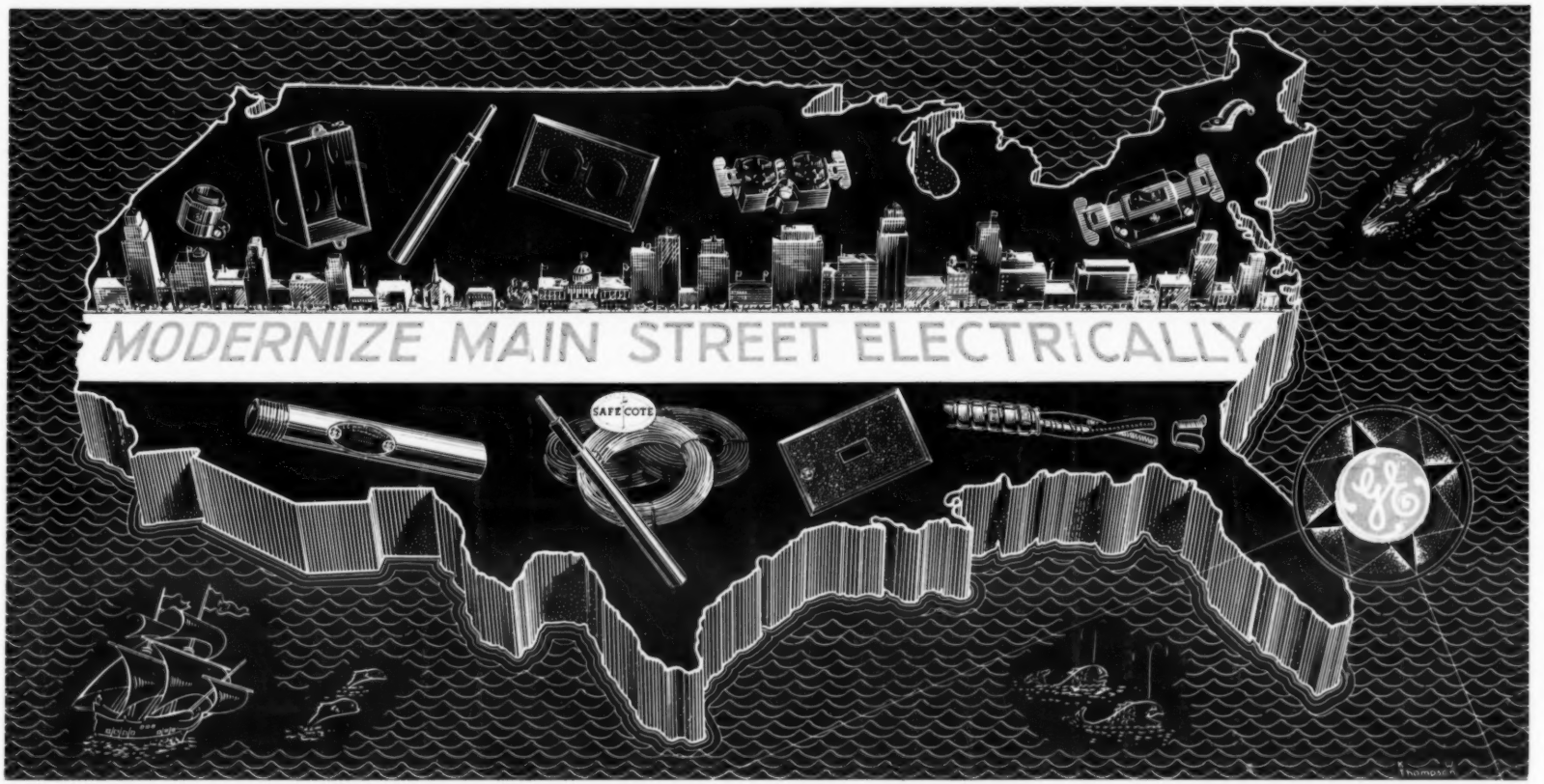

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